US009122433B2

(12) **United States Patent**
Haapanen

(10) **Patent No.: US 9,122,433 B2**
(45) **Date of Patent: Sep. 1, 2015**

(54) **CLICK-TO-PRINT SYSTEM, APPARATUS AND METHOD**

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(73) Assignee: **RICOH COMPANY, LTD.**, Tokyo (JP)

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(21) Appl. No.: **13/855,083**

(22) Filed: **Apr. 2, 2013**

(65) **Prior Publication Data**

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(51) **Int. Cl.**
G06F 3/12 (2006.01)

(52) **U.S. Cl.**
CPC ***G06F 3/1268*** (2013.01); ***G06F 3/1203*** (2013.01)

(58) **Field of Classification Search**
CPC ... G06F 3/1204; G06F 3/1228; G06F 3/1268; G06F 3/1226; G06F 3/1232; G06F 3/1247; G06F 17/30864; G06K 15/1805
USPC 358/1.15, 1.13, 1.16, 1.2, 1.8; 347/2; 709/223; 715/783; 717/177
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

7,461,377	B2 *	12/2008	Someshwar et al.	718/102
2004/0125401	A1 *	7/2004	Earl et al.	358/1.15
2005/0270572	A1 *	12/2005	Kassan	358/1.15
2006/0291945	A1 *	12/2006	Silverbrook	400/693
2007/0024896	A1 *	2/2007	Bounar	358/1.15
2007/0233834	A1	10/2007	Hattori et al.	
2007/0234354	A1	10/2007	Hattori	
2007/0245358	A1	10/2007	Hattori et al.	
2008/0082578	A1 *	4/2008	Hogue et al.	707/104.1
2008/0180726	A1 *	7/2008	Selvaraj	358/1.15
2008/0184162	A1 *	7/2008	Lindsey et al.	715/783
2008/0231886	A1 *	9/2008	Wehner et al.	358/1.15
2009/0273801	A1 *	11/2009	Steele et al.	358/1.15
2011/0063668	A1 *	3/2011	Shirai	358/1.15
2012/0019867	A1 *	1/2012	Prati et al.	358/1.15
2012/0127529	A1 *	5/2012	Brown et al.	358/1.15
2012/0250074	A1 *	10/2012	Kamppari et al.	358/1.15
2012/0265865	A1	10/2012	Tanaka et al.	
2012/0266073	A1	10/2012	Tanaka et al.	
2013/0201503	A1 *	8/2013	Miller et al.	358/1.13

OTHER PUBLICATIONS

"PrintMe Mobile—How It Works", http://w3.efi.com/printme-mobile/how-it-works.
"A mobile solution—EFI PrintMe", 2010.
D. Dineley et al., "Review: 6 AirPrint solutions for iPhones and iPads", Aug. 8, 2012, http://www.infoworld.com/print/199563.
U.S. Appl. No. 13/758,082, Kenji Hagiwara et al., filed Feb. 4, 2013.
U.S. Appl. No. 13/758,116, Greg Melendez et al., filed Feb. 4, 2013.
U.S. Appl. No. 13/758,110, Greg Anderson et al., filed Feb. 4, 2013.

* cited by examiner

Primary Examiner — David S Cammack
(74) *Attorney, Agent, or Firm* — Cooper & Dunham LLP

(57) **ABSTRACT**

Systems, apparatuses and methods are provided for simplifying print job submission by a user in a network environment. A print job in a print job stream from a terminal apparatus is detected and intercepted, and it is determined whether the intercepted print job is to be processed in a job-specific selection mode or a silent mode. In the job-specific selection mode, a printer selection user interface is provided on the terminal apparatus to permit the user to select a specific printer amongst the plural printers, and the intercepted print job is then transmitted to the specific printer. In the silent mode, the user-submitted print job is transmitted to a previously-specified direct printer.

16 Claims, 31 Drawing Sheets

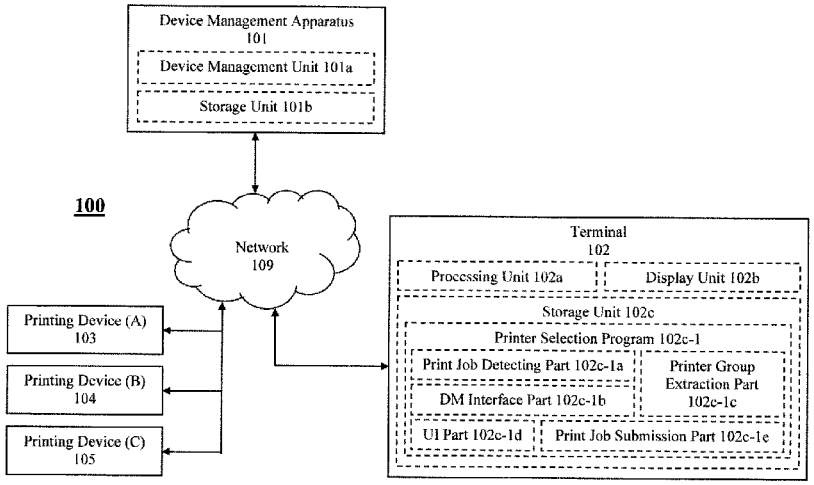
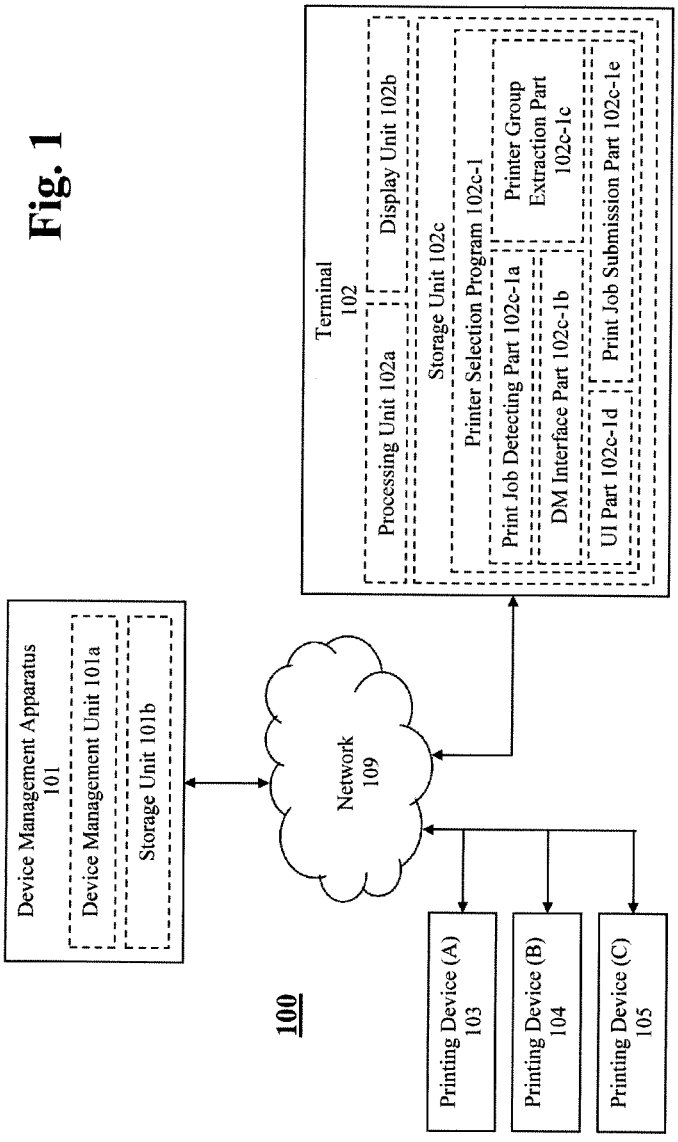


Fig. 1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Processing Unit 102a
Display Unit 102b
Storage Unit 102c
Printer Selection Program 102c-1
Print Job Detecting Part 102c-1a
Printer Group Extraction Part 102c-1c
DM Interface Part 102c-1b
UI Part 102c-1d
Print Job Submission Part 102c-1e
Device Management Apparatus
101
Device Management Unit 101a
Storage Unit 101b
Network
109
Printing Device (A)
103
Printing Device (B)
104
Printing Device (C)
105
100

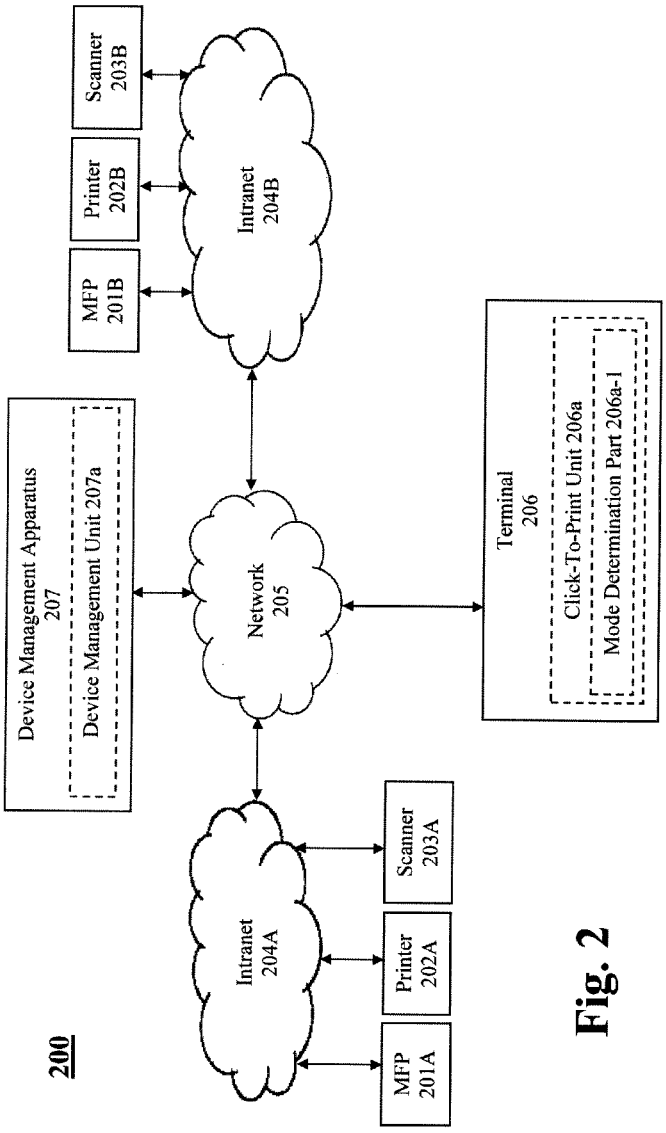
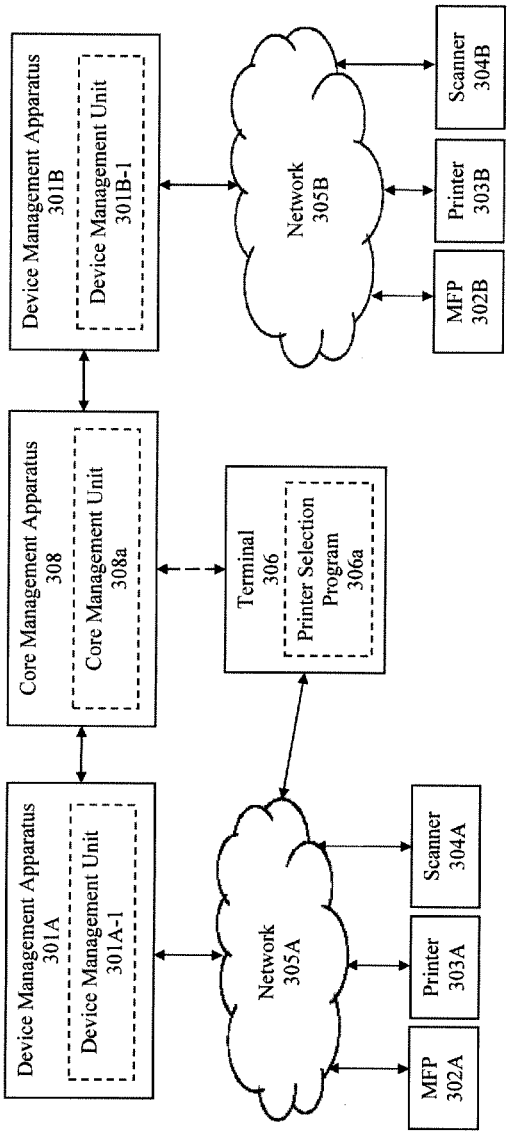

200
MFP 201A
Printer 202A
Scanner 203A
Intranet 204A
Network 205
Terminal 206
Click-To-Print Unit 206a
Mode Determination Part 206a-1
Device Management Apparatus 207
Device Management Unit 207a
MFP 201B
Printer 202B
Scanner 203B
Intranet 204B

Fig. 2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Device Management Unit
301A-1
Core Management Apparatus
308
Core Management Unit
308a
Device Management Apparatus
301B
Device Management Unit
301B-1
Terminal
306
Printer Selection
Program
306a
Network
305A
Network
305B
MFP
302A
Printer
303A
Scanner
304A
MFP
302B
Printer
303B
Scanner
304B

300

Fig. 3

DEVICE INFORMATION

ID	Name	Manufacturer	Address	Serial No.	Status	Error/Warning	Firmware Version	Department
1	Zebra XL P001	Company A	24.16.11.1	Z000140192	On	Paper Jam	3.1.1	IT
2	Zebra XP M2	Company A	24.16.11.2	Z002002595	On	Tray Open	3.1.2	Accounting
3	Zebra XP C1	Company A	24.16.11.3	Z001924859	Off	Offline	3.1.2	Legal
4	GoodScan M11	Company B	24.16.11.4	0029582	Sleep	None	1.2.1	Legal
5	HB12031	Company C	24.16.11.5	1000229586	On	None	2.0	IT
6	Noxide 1	Company D	24.16.11.6	9772338035	Sleep	Toner Low	2.009	Accounting
7	Rhino X001 SP	Company E	24.16.142.2	0124325331	On	Tray Open	10.2.1	Legal
8	Rhino X001 SP	Company E	24.16.142.3	0120324647	On	Paper Low	10.2.1	Legal
9	Rhino X001 SP	Company E	24.16.142.4	0127347369	On	None	10.2.1	IT
10	Rhino X002 SP	Company E	24.16.142.5	0127347369	Off	Offline	11.1.1	Accounting
11	Rhino X002 SP	Company E	24.16.71.1	0129984848	Sleep	None	11.1.1	Legal

Fig. 4A

PRINTER LOCATION INFORMATION		
Device ID	**IP Address**	**Location**
1	24.16.11.1	49, 12
2	24.16.11.2	50, 23
3	24.16.11.3	38, 41
4	24.16.11.4	49, 16
5	24.16.11.5	10, 27
6	24.16.11.6	25, 83
7	24.16.142.2	23, 45
8	24.16.142.3	62, 86
9	24.16.142.4	17, 15
10	24.16.142.5	5, 26
11	24.16.71.101	36, 7
12	24.16.71.102	17, 45
13	24.16.71.103	28, 11
14	24.16.71.104	38, 37

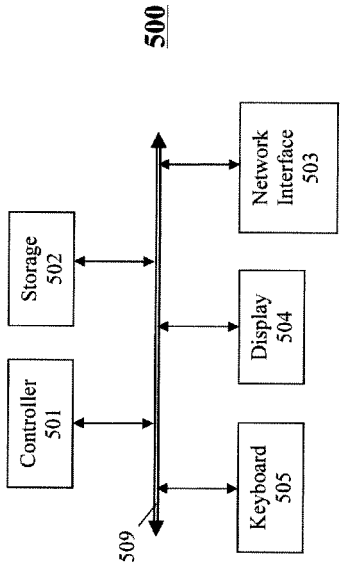
Fig. 4B

USER ACCESS INFORMATION		
Device ID	**IP Address**	**User Access**
1	24.16.11.1	A, B, C
2	24.16.11.2	A, B, D
3	24.16.11.3	B
4	24.16.11.4	B, E
5	24.16.11.5	C, E
6	24.16.11.6	A
7	24.16.142.2	A, B
8	24.16.142.3	A, B
9	24.16.142.4	C, D
10	24.16.142.5	A, B, C, D
11	24.16.71.101	E, F
12	24.16.71.102	E, F
13	24.16.71.103	E, F
14	24.16.71.104	E, F

Fig. 4C

CONFIGURATION ITEM INFORMATION		
Item ID	**Item Name**	**Item Value**
1	CurrentPrinterAddress	192.15.201.102
2	Silent	0
3	ServerAddress	192.15.201.101
4	CacheExpire	30000
5	NearbyBits	8
6	HideNearby	0
7	HideFavorites	0
8	HideBrowse	0
9	HideFilter	0
10	HideMap	0
11	Favorites	favorites_1.lst
12	CurrentFilter	custom_1
13	Fields	fields.csv
14	Categories	categories.csv

Fig. 4D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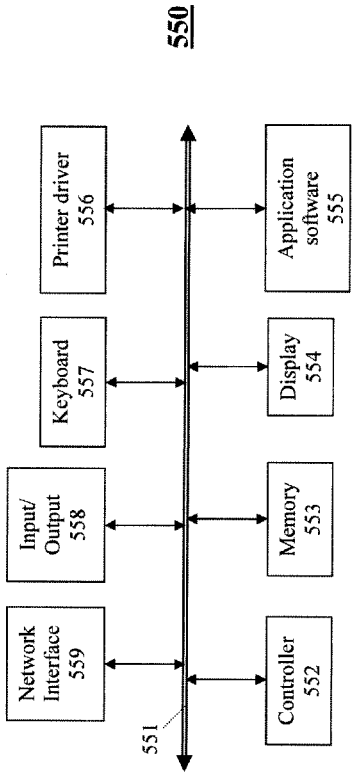
Network Interface 503
Storage 502
Display 504
Controller 501
Keyboard 505
509

Fig. 5A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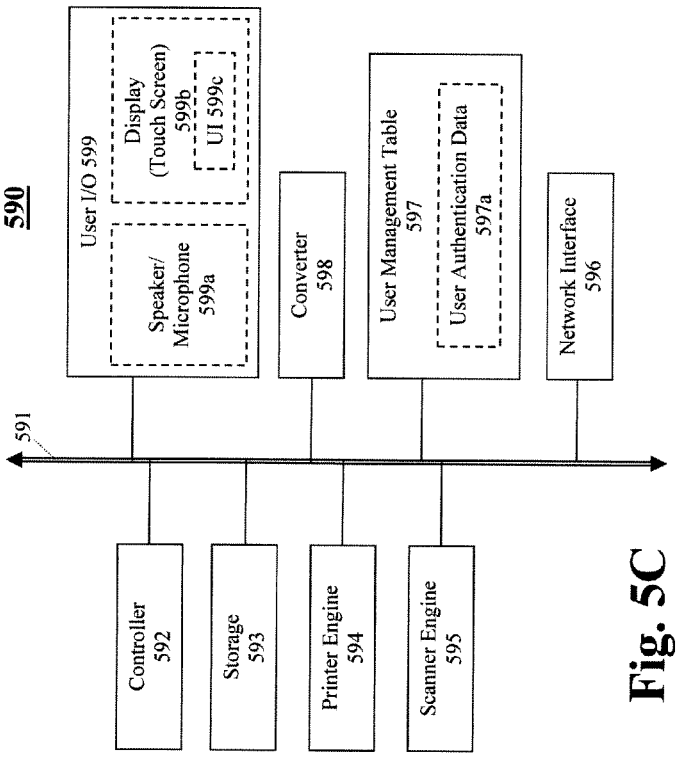
Printer driver 556
Application software 555
Keyboard 557
Display 554
Input/ Output 558
Memory 553
Network Interface 559
Controller 552
551

Fig. 5B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User I/O 599
Display (Touch Screen) 599b
UI 599c
Speaker/ Microphone 599a
Converter 598
User Management Table 597
User Authentication Data 597a
Network Interface 596
591
Controller 592
Storage 593
Printer Engine 594
Scanner Engine 595

Fig. 5C

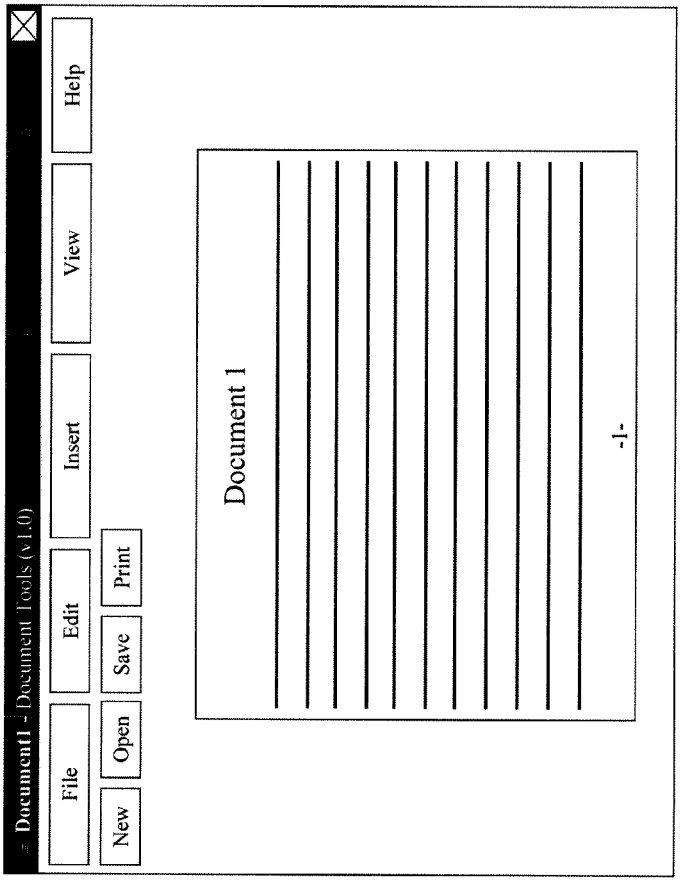
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Fig. 6

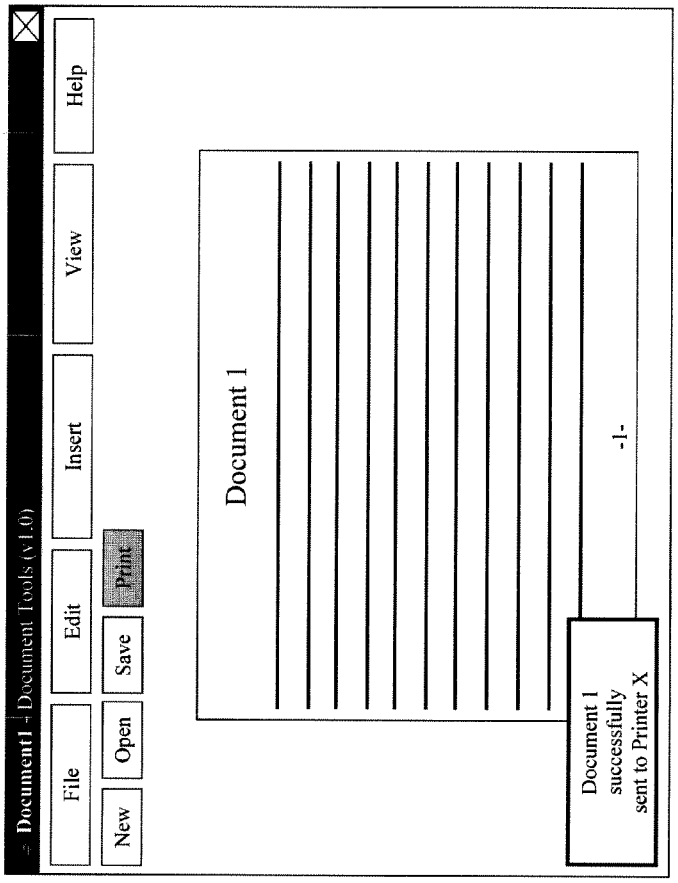
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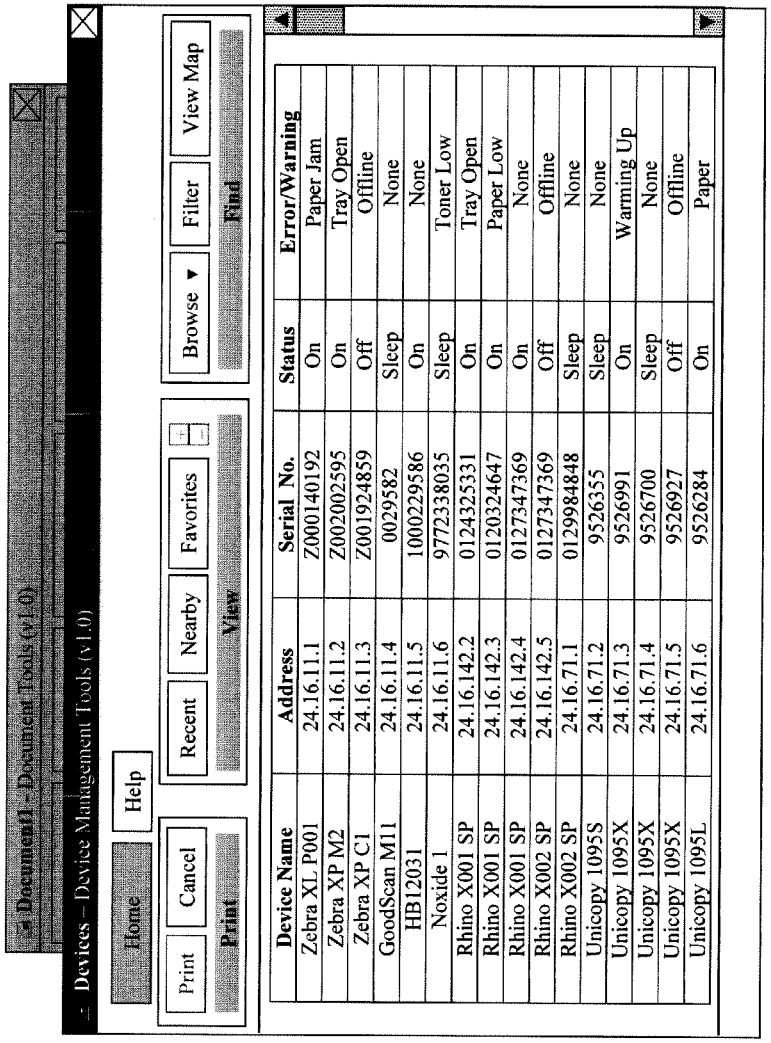
Fig. 7



Device Name	Address	Serial No.	Status	Error/Warning
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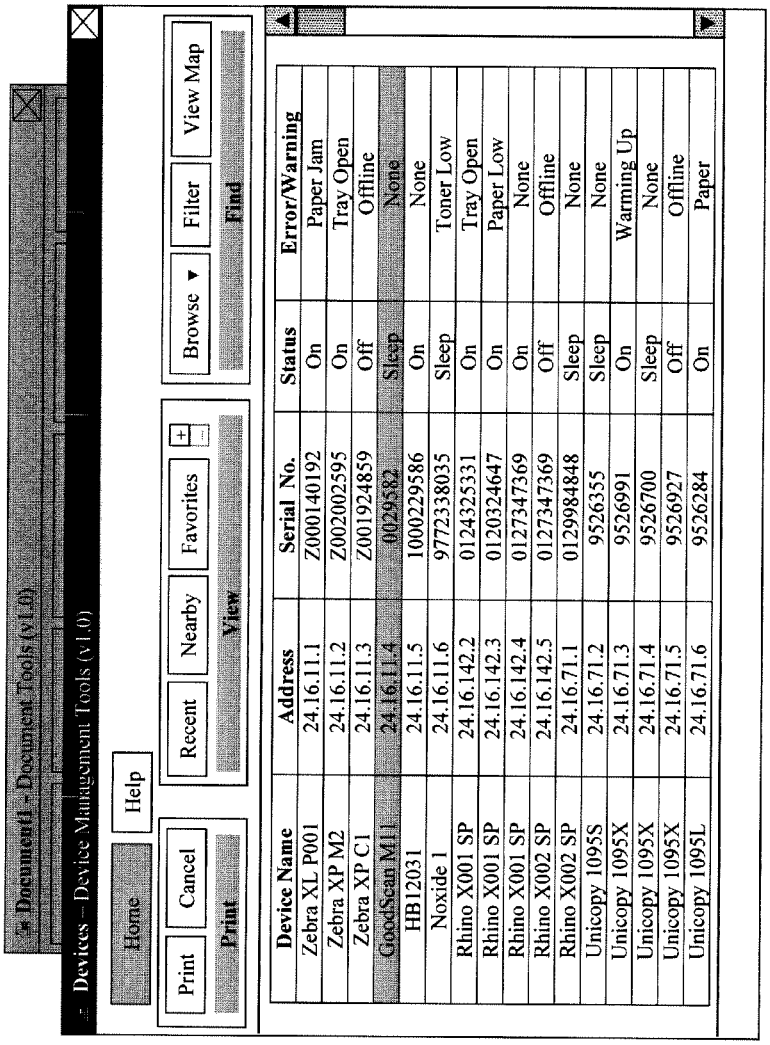
Zebra XP M2	24.16.11.2	Z002002595	On	Tray Open
Zebra XP C1	24.16.11.3	Z001924859	Off	Offline
GoodScan M11	24.16.11.4	0029582	Sleep	None
HB12031	24.16.11.5	1000229586	On	None
Noxide 1	24.16.11.6	9772338035	Sleep	Toner Low
Rhino X001 SP	24.16.142.2	0124325331	On	Tray Open
Rhino X001 SP	24.16.142.3	0120324647	On	Paper Low
Rhino X001 SP	24.16.142.4	0127347369	On	None
Rhino X002 SP	24.16.142.5	0127347369	Off	Offline
Rhino X002 SP	24.16.71.1	0129984848	Sleep	None
Unicopy 1095S	24.16.71.2	9526355	Sleep	None
Unicopy 1095X	24.16.71.3	9526991	On	Warming Up
Unicopy 1095X	24.16.71.4	9526700	Sleep	None
Unicopy 1095X	24.16.71.5	9526927	Off	Offline
Unicopy 1095L	24.16.71.6	9526284	On	Paper

Fig. 8A



Device Name	Address	Serial No.	Status	Error/Warning
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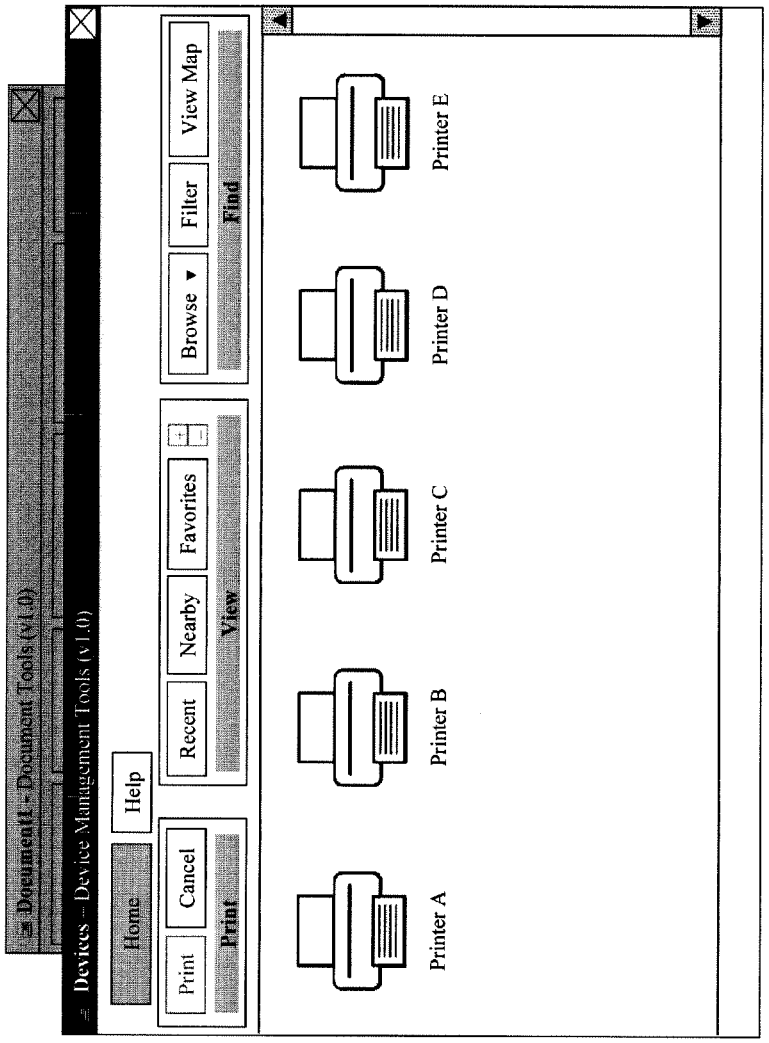
Zebra XP M2	24.16.11.2	Z002002595	On	Tray Open
Zebra XP C1	24.16.11.3	Z001924859	Off	Offline
GoodScan M11	24.16.11.4	0029582	Sleep	None
HB12031	24.16.11.5	1000229586	On	None
Noxide 1	24.16.11.6	9772338035	Sleep	Toner Low
Rhino X001 SP	24.16.142.2	0124325331	On	Tray Open
Rhino X001 SP	24.16.142.3	0120324647	On	Paper Low
Rhino X001 SP	24.16.142.4	0127347369	On	None
Rhino X002 SP	24.16.142.5	0127347369	Off	Offline
Rhino X002 SP	24.16.71.1	0129984848	Sleep	None
Unicopy 1095S	24.16.71.2	9526355	Sleep	None
Unicopy 1095X	24.16.71.3	9526991	On	Warming Up
Unicopy 1095X	24.16.71.4	9526700	Sleep	None
Unicopy 1095X	24.16.71.5	9526927	Off	Offline
Unicopy 1095L	24.16.71.6	9526284	On	Paper

Fig. 8B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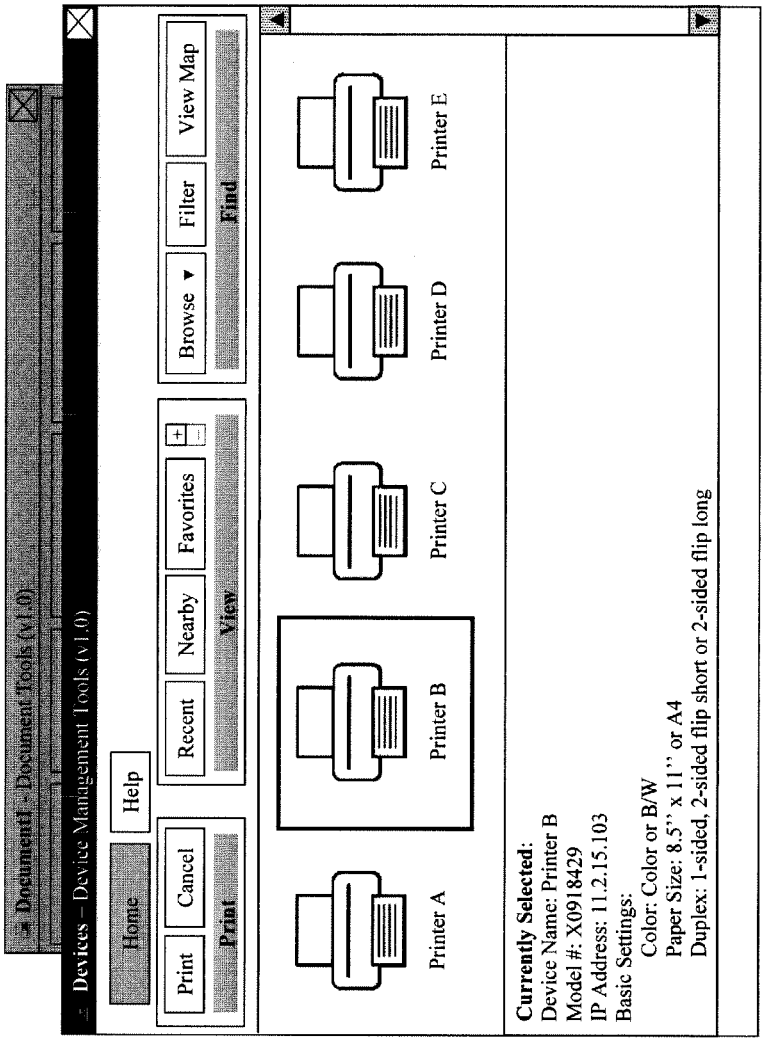
Printer E

Fig. 8C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Browse
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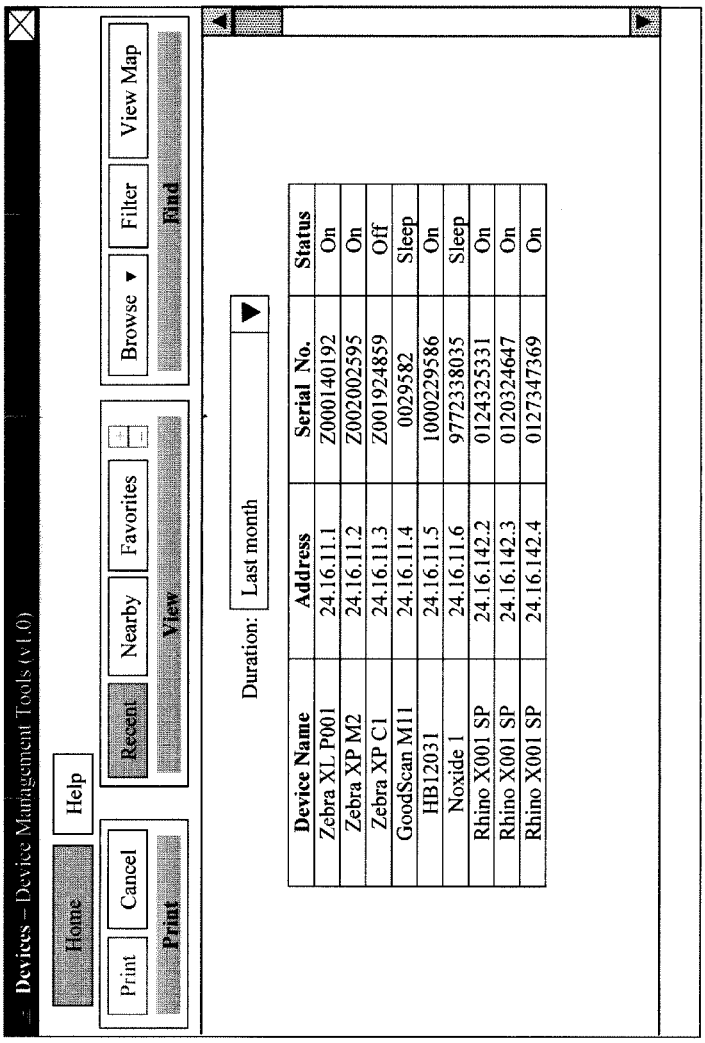
View Map
Find
Printer A
Printer B
Printer C
Printer D
Printer E
Currently Selected:
Device Name: Printer B
Model #: X0918429
IP Address: 11.2.15.103
Basic Settings:
Color: Color or B/W
Paper Size: 8.5'' x 11'' or A4
Duplex: 1-sided, 2-sided flip short or 2-sided flip long

Fig. 8D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Zebra XP M2 | 24.16.11.2 | Z002002595 | On
Zebra XP C1 | 24.16.11.3 | Z001924859 | Off
GoodScan M11 | 24.16.11.4 | 0029582 | Sleep
HB12031 | 24.16.11.5 | 1000229586 | On
Noxide 1 | 24.16.11.6 | 9772338035 | Sleep
Rhino X001 SP | 24.16.142.2 | 0124325331 | On
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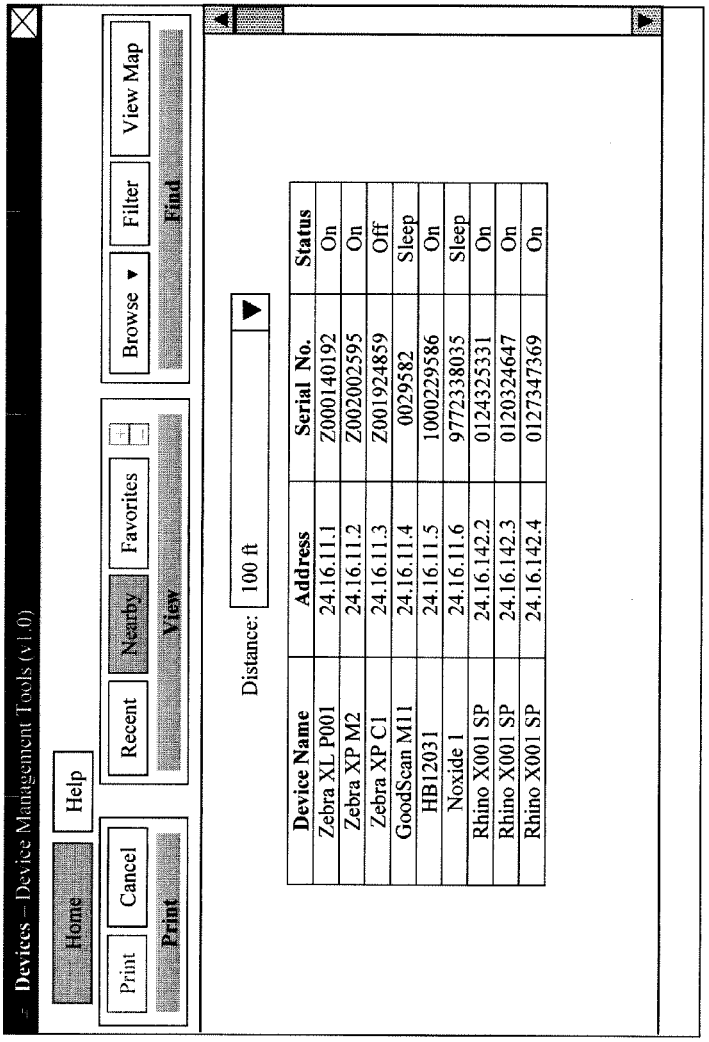
Fig. 9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Browse
Filter
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Find
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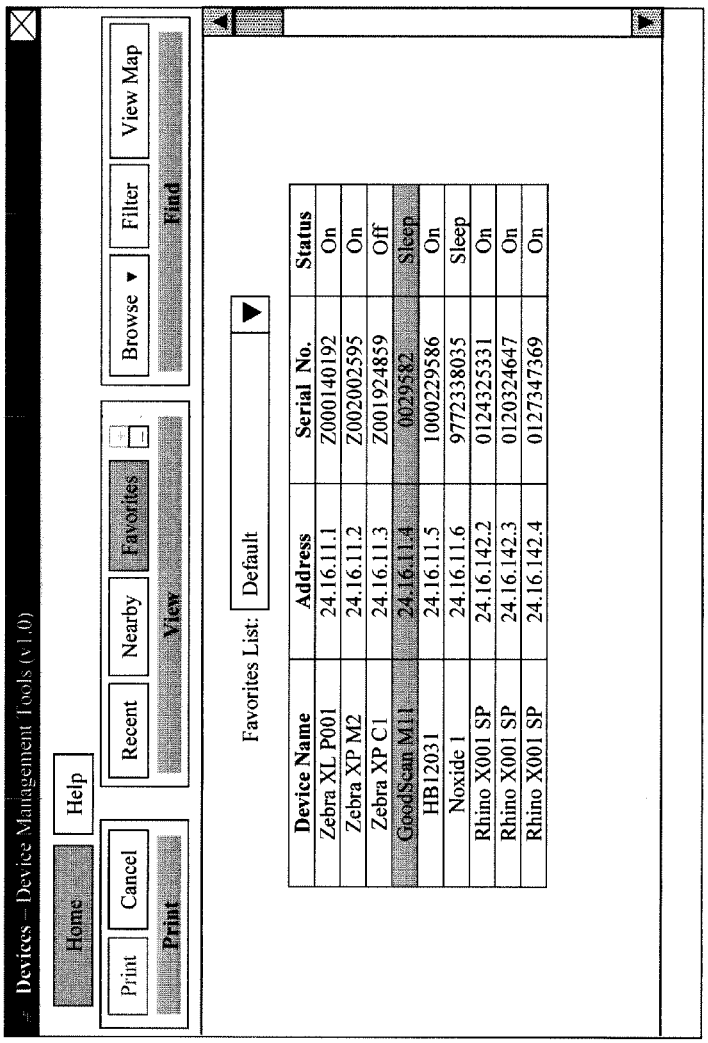
Zebra XP M2 | 24.16.11.2 | Z002002595 | On
Zebra XP C1 | 24.16.11.3 | Z001924859 | Off
GoodScan M11 | 24.16.11.4 | 0029582 | Sleep
HB12031 | 24.16.11.5 | 1000229586 | On
Noxide 1 | 24.16.11.6 | 9772338035 | Sleep
Rhino X001 SP | 24.16.142.2 | 0124325331 | On
Rhino X001 SP | 24.16.142.3 | 0120324647 | On
Rhino X001 SP | 24.16.142.4 | 0127347369 | On

Fig. 10



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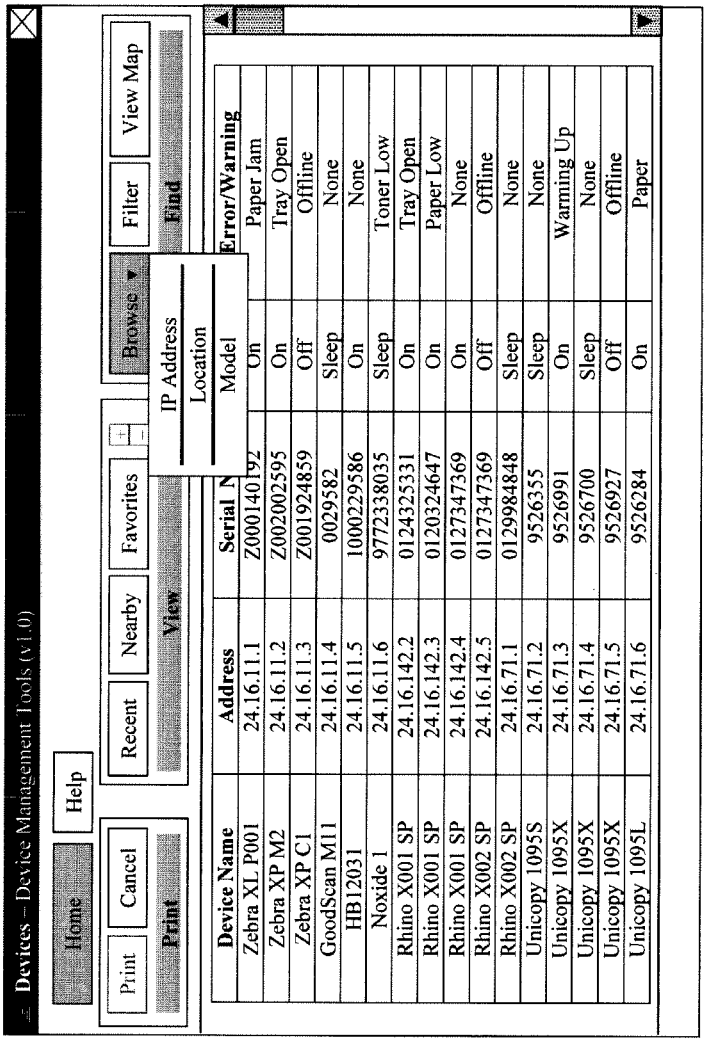
GoodScan M11	24.16.11.4	0029582	Sleep
HB12031	24.16.11.5	1000229586	On
Noxide 1	24.16.11.6	9772338035	Sleep
Rhino X001 SP	24.16.142.2	0124325331	On
Rhino X001 SP	24.16.142.3	0120324647	On
Rhino X001 SP	24.16.142.4	0127347369	On

Fig. 11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Find
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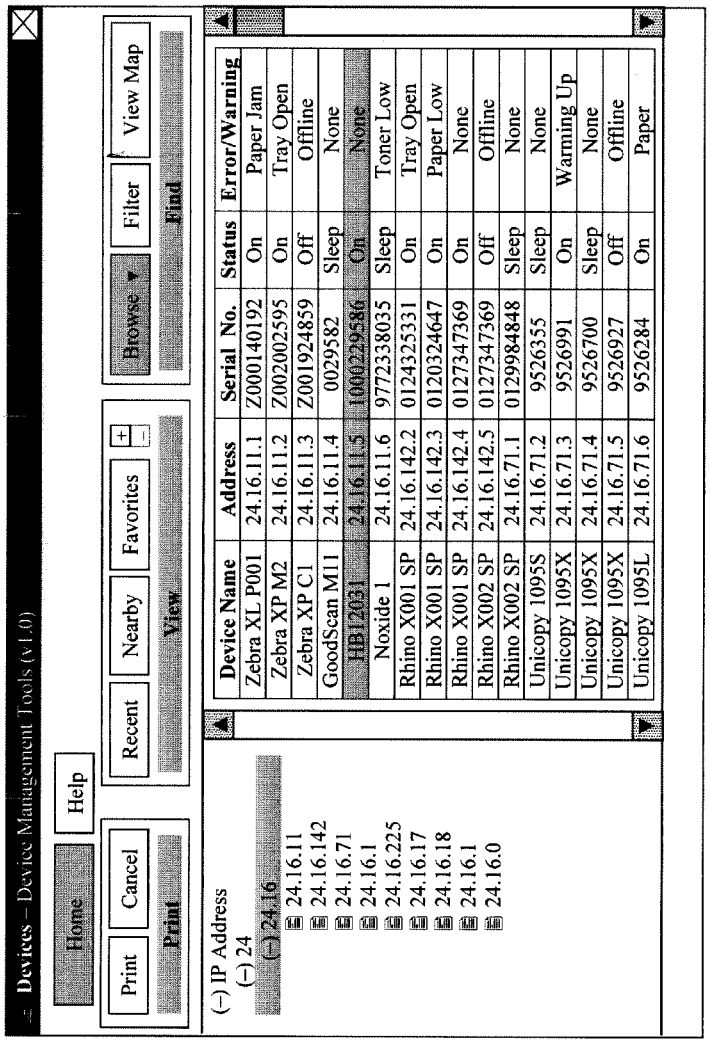
Address
Serial N
Model
Error/Warning
Zebra XL P001 24.16.11.1 Z000140192 On Paper Jam
Zebra XP M2 24.16.11.2 Z002002595 On Tray Open
Zebra XP C1 24.16.11.3 Z001924859 Off Offline
GoodScan M11 24.16.11.4 0029582 Sleep None
HB12031 24.16.11.5 1000229586 On None
Noxide 1 24.16.11.6 9772338035 Sleep Toner Low
Rhino X001 SP 24.16.142.2 0124325331 On Tray Open
Rhino X001 SP 24.16.142.3 0120324647 On Paper Low
Rhino X001 SP 24.16.142.4 0127347369 On None
Rhino X002 SP 24.16.142.5 0127347369 Off Offline
Rhino X002 SP 24.16.71.1 0129984848 Sleep None
Unicopy 1095S 24.16.71.2 9526355 Sleep None
Unicopy 1095X 24.16.71.3 9526991 On Warming Up
Unicopy 1095X 24.16.71.4 9526700 Sleep None
Unicopy 1095X 24.16.71.5 9526927 Off Offline
Unicopy 1095L 24.16.71.6 9526284 On Paper

Fig. 12A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Home
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Browse
Filter
View Map
Find
(–) IP Address
(–) 24
(–) 24.16
24.16.11
24.16.142
24.16.71
24.16.1
24.16.225
24.16.17
24.16.18
24.16.1
24.16.0
Device Name | Address | Serial No. | Status | Error/Warning
Zebra XL P001 | 24.16.11.1 | Z000140192 | On | Paper Jam
Zebra XP M2 | 24.16.11.2 | Z002002595 | On | Tray Open
Zebra XP C1 | 24.16.11.3 | Z001924859 | Off | Offline
GoodScan M11 | 24.16.11.4 | 0029582 | Sleep | None
HB12031 | 24.16.11.5 | 1000229586 | On | None
Noxide 1 | 24.16.11.6 | 9772338035 | Sleep | Toner Low
Rhino X001 SP | 24.16.142.2 | 0124325331 | On | Tray Open
Rhino X001 SP | 24.16.142.3 | 0120324647 | On | Paper Low
Rhino X001 SP | 24.16.142.4 | 0127347369 | On | None
Rhino X002 SP | 24.16.142.5 | 0127347369 | Off | Offline
Rhino X002 SP | 24.16.71.1 | 0129984848 | Sleep | None
Unicopy 1095S | 24.16.71.2 | 9526355 | Sleep | None
Unicopy 1095X | 24.16.71.3 | 9526991 | On | Warming Up
Unicopy 1095X | 24.16.71.4 | 9526700 | Sleep | None
Unicopy 1095X | 24.16.71.5 | 9526927 | Off | Offline
Unicopy 1095L | 24.16.71.6 | 9526284 | On | Paper

Fig. 12B

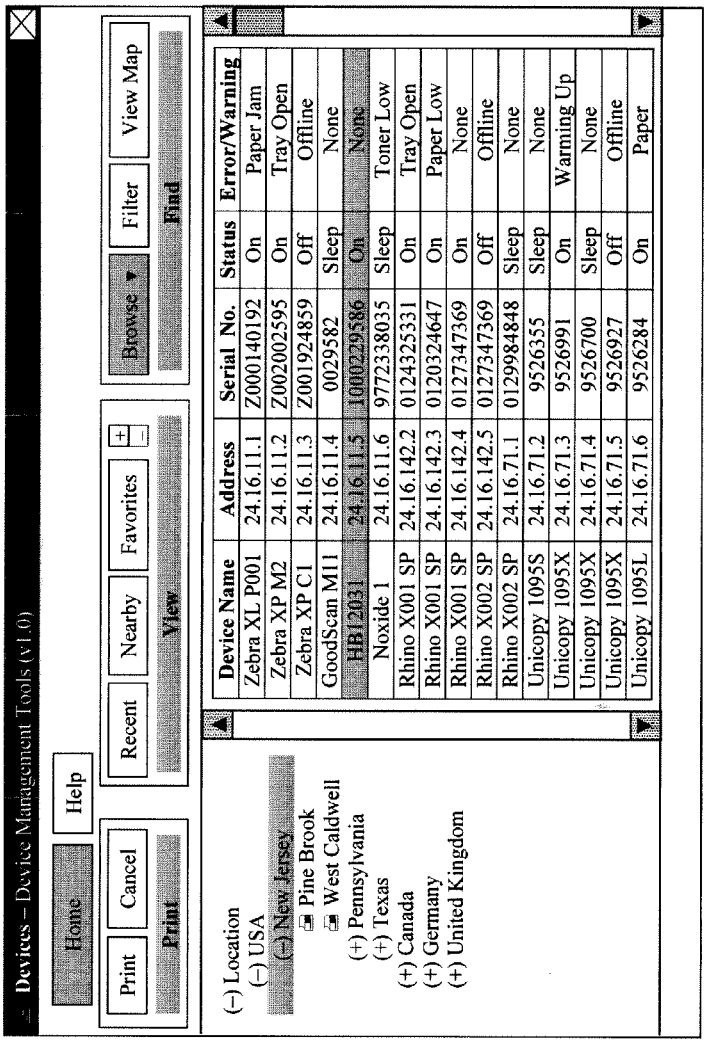
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
(–) Location
(–) USA
(–) New Jersey
Pine Brook
West Caldwell
(+) Pennsylvania
(+) Texas
(+) Canada
(+) Germany
(+) United Kingdom
Device Name
Address
Serial No.
Status
Error/Warning
Zebra XL P001
24.16.11.1
Z000140192
On
Paper Jam
Zebra XP M2
24.16.11.2
Z002002595
On
Tray Open
Zebra XP C1
24.16.11.3
Z001924859
Off
Offline
GoodScan M11
24.16.11.4
0029582
Sleep
None
HB12031
24.16.11.5
1000229586
On
None
Noxide 1
24.16.11.6
9772338035
Sleep
Toner Low
Rhino X001 SP
24.16.142.2
0124325331
On
Tray Open
Rhino X001 SP
24.16.142.3
0120324647
On
Paper Low
Rhino X001 SP
24.16.142.4
0127347369
On
None
Rhino X002 SP
24.16.142.5
0127347369
Off
Offline
Rhino X002 SP
24.16.71.1
0129984848
Sleep
None
Unicopy 1095S
24.16.71.2
9526355
Sleep
None
Unicopy 1095X
24.16.71.3
9526991
On
Warming Up
Unicopy 1095X
24.16.71.4
9526700
Sleep
None
Unicopy 1095X
24.16.71.5
9526927
Off
Offline
Unicopy 1095L
24.16.71.6
9526284
On
Paper

Fig. 12C

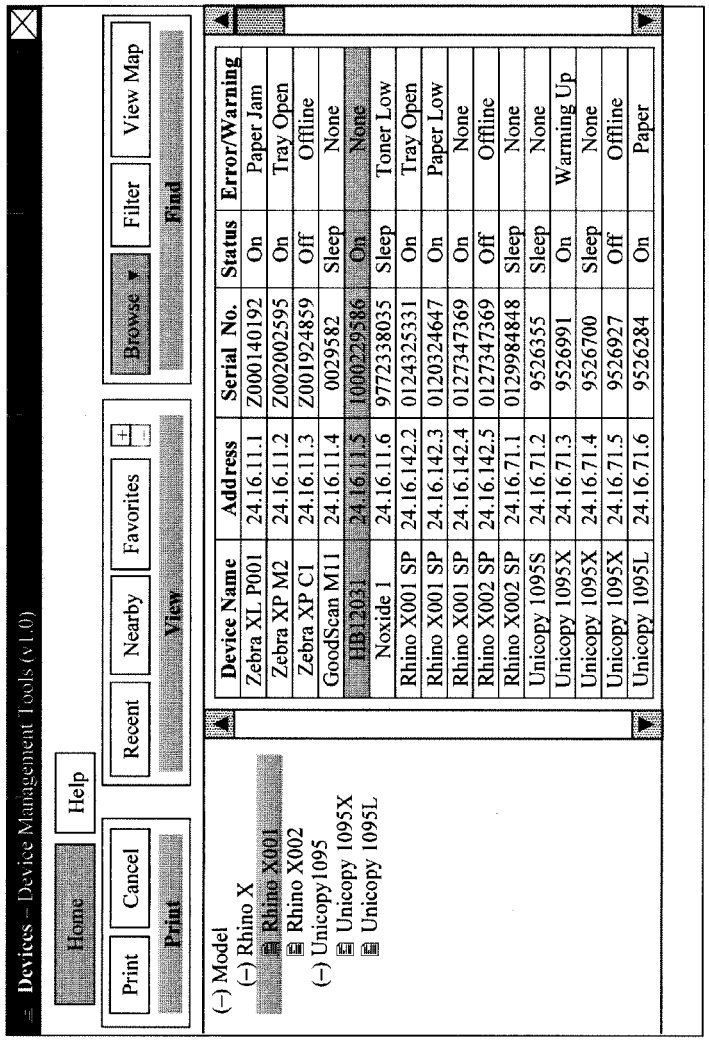
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
(–) Model
(–) Rhino X
Rhino X001
Rhino X002
(–) Unicopy1095
Unicopy 1095X
Unicopy 1095L
Device Name
Address
Serial No.
Status
Error/Warning
Zebra XL P001 24.16.11.1 Z00140192 On Paper Jam
Zebra XP M2 24.16.11.2 Z002002595 On Tray Open
Zebra XP C1 24.16.11.3 Z001924859 Off Offline
GoodScan M11 24.16.11.4 0029582 Sleep None
HB12031 24.16.11.5 1000229586 On None
Noxide 1 24.16.11.6 9772338035 Sleep Toner Low
Rhino X001 SP 24.16.142.2 0124325331 On Tray Open
Rhino X001 SP 24.16.142.3 0120324647 On Paper Low
Rhino X001 SP 24.16.142.4 0127347369 On None
Rhino X002 SP 24.16.142.5 0127347369 Off Offline
Rhino X002 SP 24.16.71.1 0129984848 Sleep None
Unicopy 1095S 24.16.71.2 9526355 Sleep None
Unicopy 1095X 24.16.71.3 9526991 On Warming Up
Unicopy 1095X 24.16.71.4 9526700 Sleep None
Unicopy 1095X 24.16.71.5 9526927 Off Offline
Unicopy 1095L 24.16.71.6 9526284 On Paper

Fig. 12D

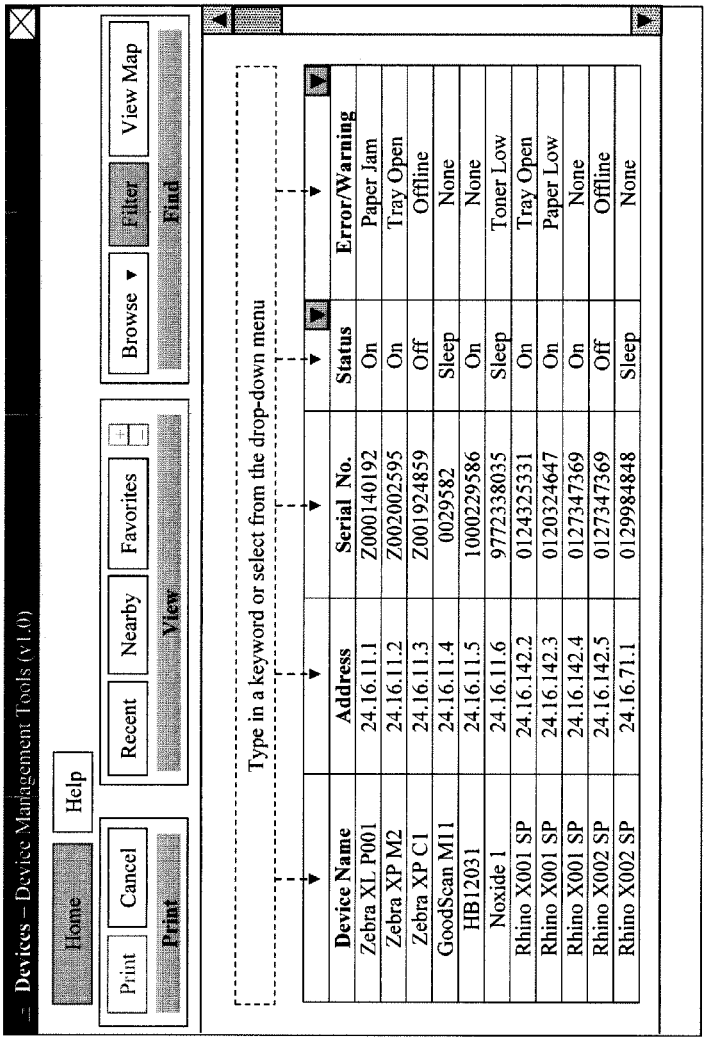
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
Type in a keyword or select from the drop-down menu
Device Name
Address
Serial No.
Status
Error/Warning
Zebra XL P001 24.16.11.1 Z000140192 On Paper Jam
Zebra XP M2 24.16.11.2 Z002002595 On Tray Open
Zebra XP C1 24.16.11.3 Z001924859 Off Offline
GoodScan M11 24.16.11.4 0029582 Sleep None
HB12031 24.16.11.5 1000229586 On None
Noxide 1 24.16.11.6 9772338035 Sleep Toner Low
Rhino X001 SP 24.16.142.2 0124325331 On Tray Open
Rhino X001 SP 24.16.142.3 0120324647 On Paper Low
Rhino X001 SP 24.16.142.4 0127347369 On None
Rhino X002 SP 24.16.142.5 0127347369 Off Offline
Rhino X002 SP 24.16.71.1 0129984848 Sleep None

Fig. 13

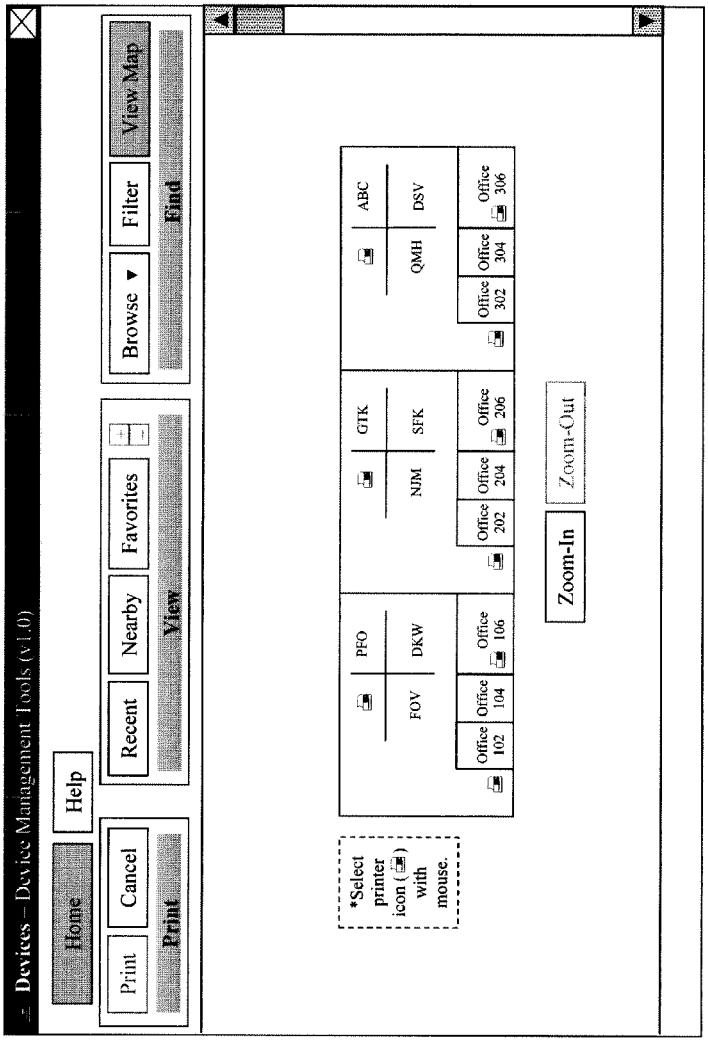
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
*Select printer icon ( ) with mouse.
PFO
FOV
DKW
GTK
NJM
SFK
ABC
QMH
DSV
Office 102
Office 104
Office 106
Office 202
Office 204
Office 206
Office 302
Office 304
Office 306
Zoom-In
Zoom-Out

Fig. 14A

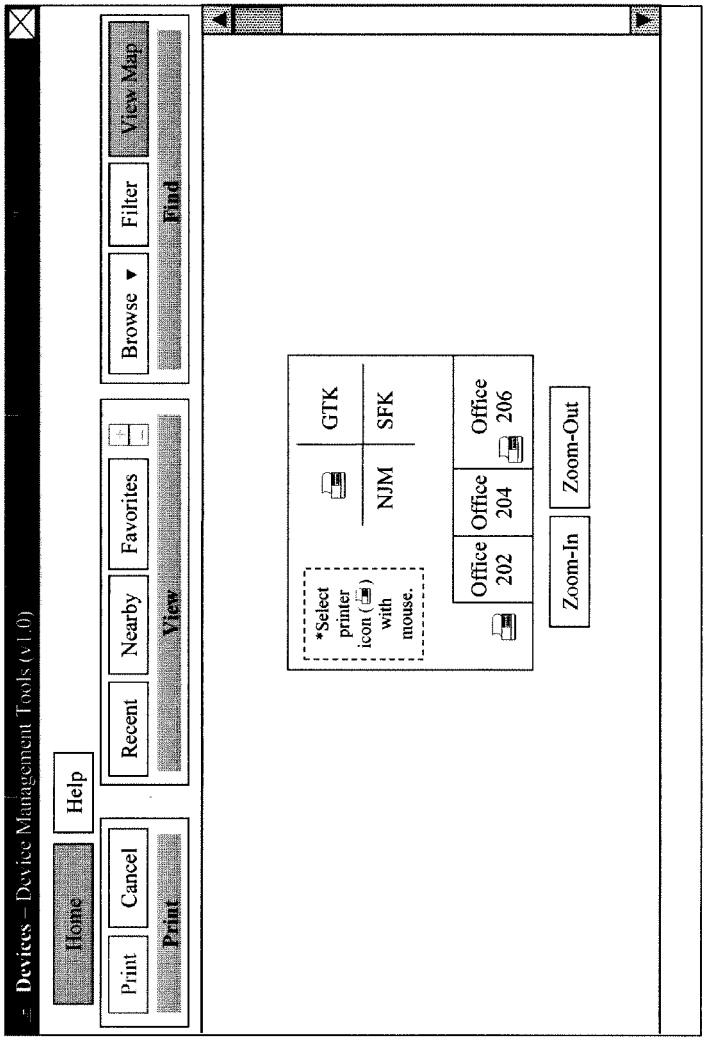
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
*Select printer icon ( ) with mouse.
GTK
NJM
SFK
Office 202
Office 204
Office 206
Zoom-In
Zoom-Out

Fig. 14B

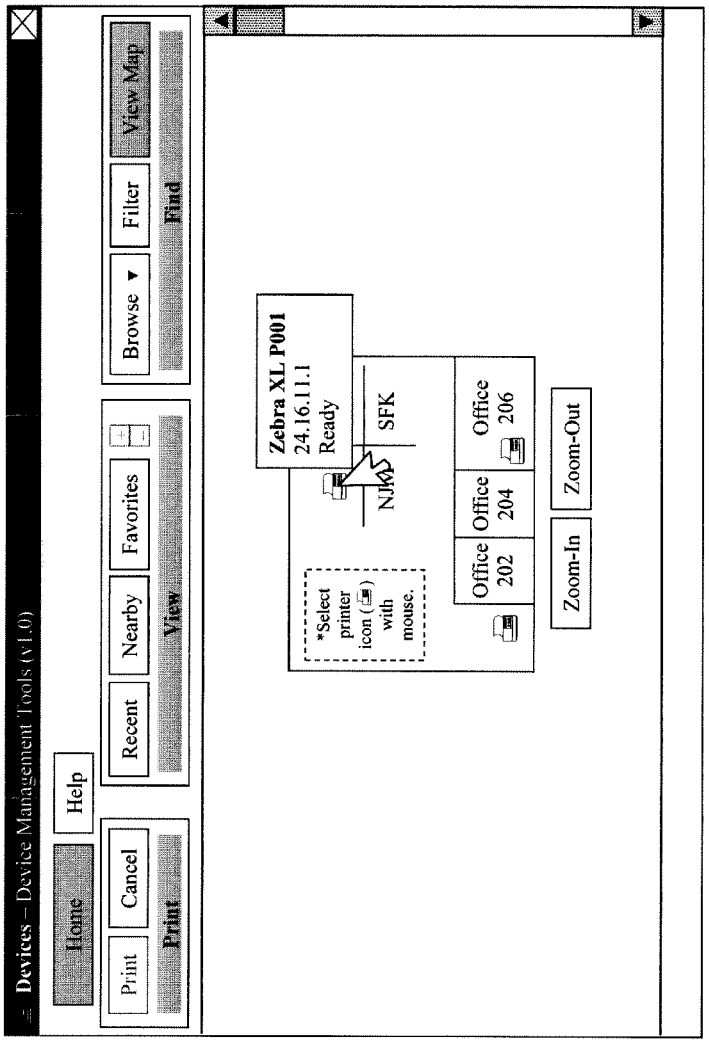
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
Zebra XL P001
24.16.11.1
Ready
*Select printer icon ( ) with mouse.
NJK
SFK
Office 202
Office 204
Office 206
Zoom-In
Zoom-Out

Fig. 14C

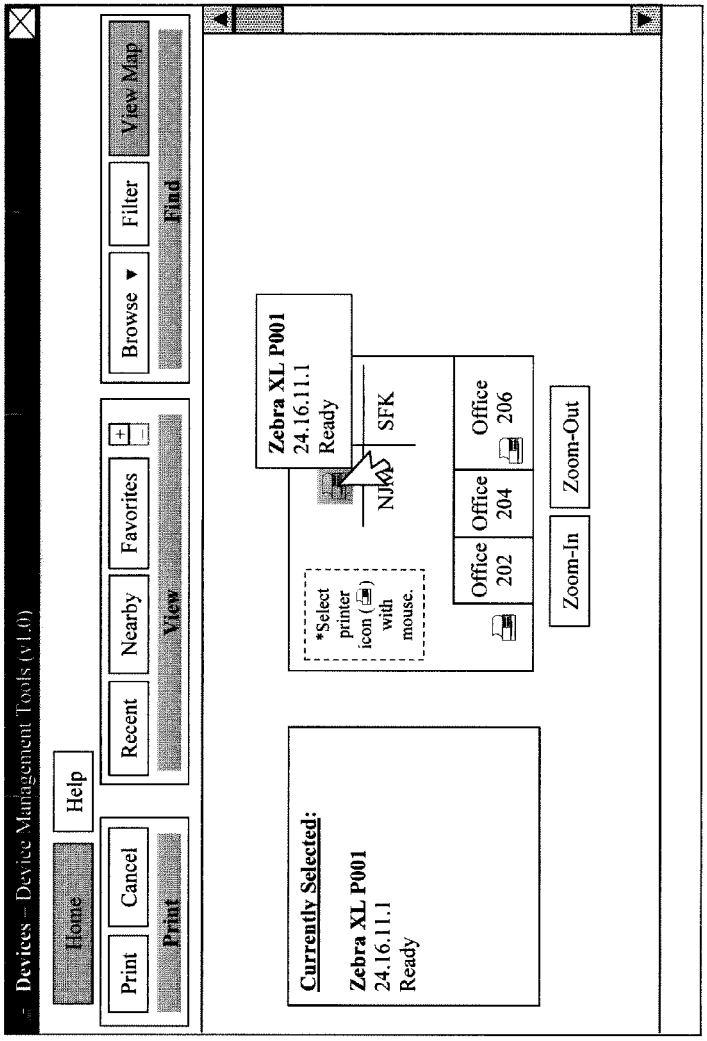
Devices – Device Management Tools (v1.0)
Home
Help
Print
Cancel
Print
Recent
Nearby
Favorites
View
Browse
Filter
View Map
Find
Currently Selected:
Zebra XL P001
24.16.11.1
Ready
*Select printer icon ( ) with mouse.
Zebra XL P001
24.16.11.1
Ready
NJ
SFK
Office 202
Office 204
Office 206
Zoom-In
Zoom-Out

Fig. 14D

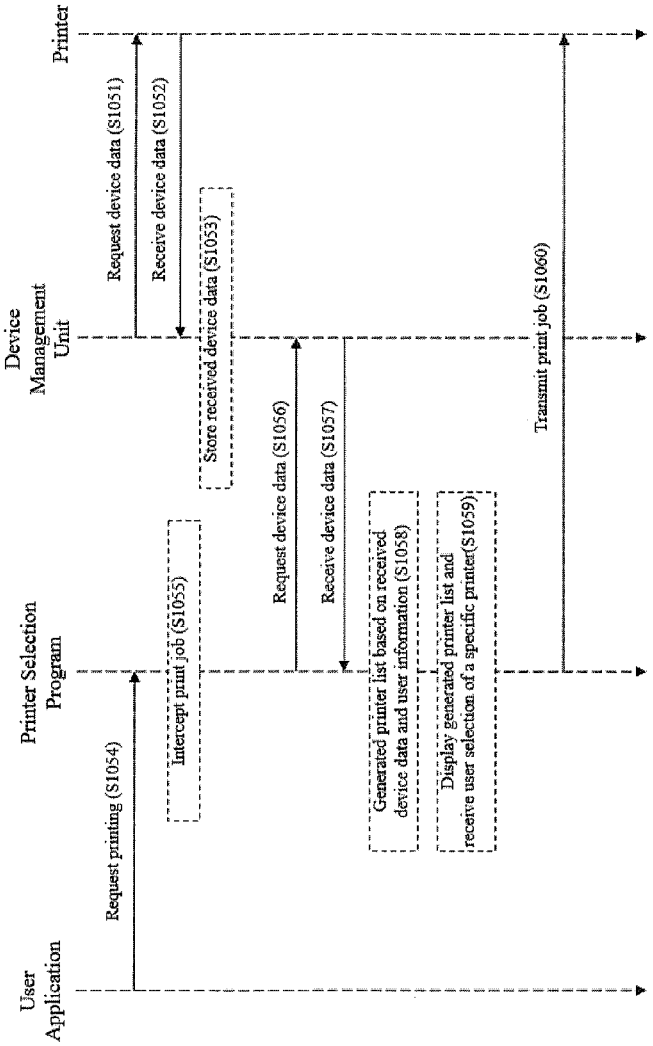
User Application
Printer Selection Program
Device Management Unit
Printer
Request printing (S1054)
Intercept print job (S1055)
Request device data (S1051)
Receive device data (S1052)
Store received device data (S1053)
Request device data (S1056)
Receive device data (S1057)
Generated printer list based on received device data and user information (S1058)
Display generated printer list and receive user selection of a specific printer(S1059)
Transmit print job (S1060)

Fig. 15

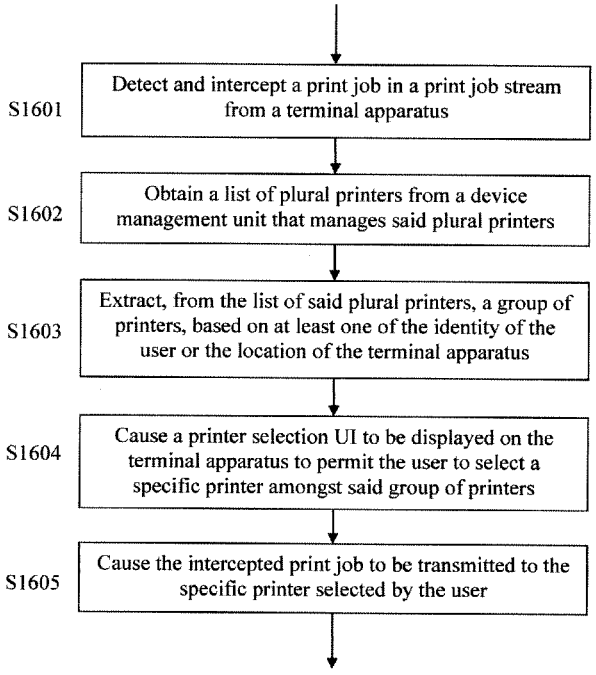
S1601
Detect and intercept a print job in a print job stream from a terminal apparatus
S1602
Obtain a list of plural printers from a device management unit that manages said plural printers
S1603
Extract, from the list of said plural printers, a group of printers, based on at least one of the identity of the user or the location of the terminal apparatus
S1604
Cause a printer selection UI to be displayed on the terminal apparatus to permit the user to select a specific printer amongst said group of printers
S1605
Cause the intercepted print job to be transmitted to the specific printer selected by the user

Fig. 16

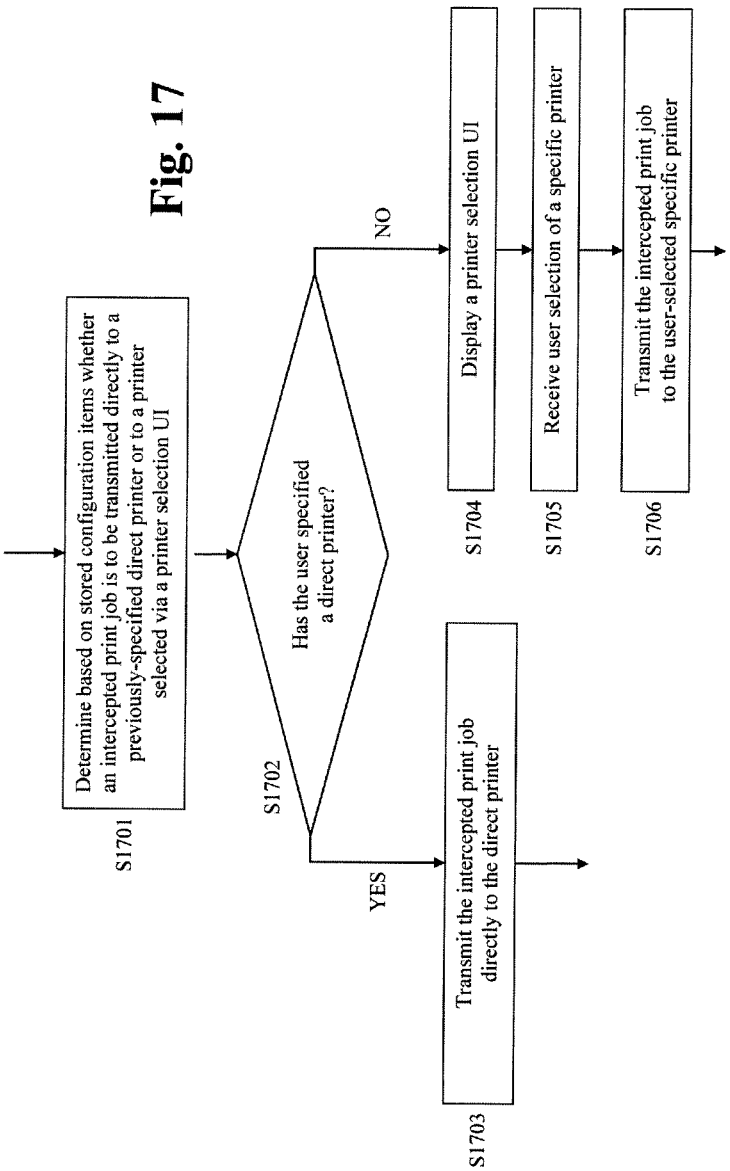
Determine based on stored configuration items whether an intercepted print job is to be transmitted directly to a previously-specified direct printer or to a printer selected via a printer selection UI
S1701
Has the user specified a direct printer?
S1702
YES
NO
Transmit the intercepted print job directly to the direct printer
S1703
Display a printer selection UI
S1704
Receive user selection of a specific printer
S1705
Transmit the intercepted print job to the user-selected specific printer
S1706

Fig. 17

CLICK-TO-PRINT SYSTEM, APPARATUS AND METHOD

TECHNICAL FIELD

This disclosure relates to tools (such as systems, apparatuses, methodologies, computer program products, etc.) for simplifying print job submission, and more particularly, for simplifying print job submission by a user in a network environment.

BACKGROUND

In the current information age, information technology (IT) tools are extensively used in enterprises and other organizations in order to facilitate processing of documents and data.

Typically, a network environment includes a plurality of printing devices, any of which may be used to print a document. When a user prints a document, the user is displayed a list of printers that are currently installed on the user's computer. However, such list does not include any newly available printers that have not been installed on the user's computer. Further, in many instances, the number of available printing devices is too large for the user to readily identify which printer is most suitable for the print job at hand.

There exists a need for an improved method for printing in a network environment.

SUMMARY

Various tools (for example, a system, an apparatus, application software, etc.) can be provided to simplify printing for a user in a network environment having a plurality of printers.

In an aspect of this disclosure, a click-to-print program operates on a user terminal to detect and intercept a print job in a print job stream. At such time, a group of printers, determined based on user identification and/or user location information, is presented in a printer selection user interface (UI) for user selection of a specific printer amongst the plural printers. Upon selection of a specific printer, the intercepted print job is transmitted to the specific printer. In such approach, it is not necessary to maintain a separate driver for each printer device and it is not necessary to install a printer definition and/or print queue for each output device. Further, the user need not identify a suitable printer for the print job. Instead, the user can simply click the print button and the print job will be submitted in a print job stream, and at such time, the printers that may be of use to the user can be determined.

For example, such approach can be integrated with a device management system, in order to access the device data maintained by the device management system. The click-to-print program can be configured to obtain a list of printers from a device management unit or a device database maintained by the device management system which manages the printers.

In another aspect, a click-to-print program may operate in either of a job-specific selection mode or a silent mode. In job-specific selection mode, the printer selection UI displays a group of printers extracted from the list of printers managed by device management system, and such group is preferably a limited subset of the managed printers that contains printers determined to be more likely to be selected by the user. On the other hand, in silent mode, the print job submission part causes the user-submitted print job to be transmitted to a previously-specified direct printer.

In another aspect, a mode selection user interface is provided on the terminal apparatus, through which the user can specify a direct printer. After a direct printer is specified for silent mode, print jobs submitted by the user are automatically transmitted to the direct printer without prompting the user to select a printer. A mode determination part may determine whether an intercepted print job is to be processed in job-specific selection mode or in silent mode based on whether the user has specified a direct printer.

In another aspect, the printer selection UI may be configured to include any of various features to simplify the printer selection process for the user. For example, the printer selection UI can include a filter part for filtering the display of printers to limit displayed printers to those matching one or more filter criteria. As another example, the printer selection UI may include a map viewing part for displaying a map view of printers at or near a specified location (for example, the location of the user or the terminal apparatus). Since the map view graphically shows a location of each specific printer on a map, the user can readily select a locationally-preferred printer. Further, the map viewing part may be configured to display printer characteristics or properties of the selected printer.

BRIEF DESCRIPTION OF THE DRAWINGS

The aforementioned and other aspects, features and advantages can be more readily understood from the following detailed description with reference to the accompanying drawings wherein:

FIG. **1** shows a block diagram of a system for managing a plurality of network-connected devices, according to an exemplary embodiment;

FIG. **2** shows a block diagram of a system for managing a plurality of network-connected devices, according to another exemplary embodiment;

FIG. **3** shows a block diagram of a system for managing a plurality of network-connected devices, according to another exemplary embodiment;

FIG. **4**A shows sample device information, according to an exemplary embodiment;

FIG. **4**B shows sample printer location information, according to an exemplary embodiment;

FIG. **4**C shows sample user access information, according to an exemplary embodiment;

FIG. **4**D shows sample configuration item information, according to an exemplary embodiment;

FIG. **5**A shows a block diagram of an exemplary configuration of a device management apparatus, such as illustrated in FIGS. **1**-**3**;

FIG. **5**B shows a block diagram of an exemplary configuration of a terminal, such as illustrated in FIGS. **1**-**3**;

FIG. **5**C shows a block diagram of an exemplary configuration of a multi-function device, such as illustrated in FIGS. **2** and **3**;

FIG. **6** shows a sample screenshot of a user application, according to an exemplary embodiment;

FIG. **7** shows a sample screenshot of a user application after the user has requested printing, according to an exemplary embodiment;

FIGS. **8**A-**8**D show sample screenshots of a printer selection user interface (UI), according to an exemplary embodiment;

FIG. **9** shows a sample screenshot of a printer selection UI, according to an exemplary embodiment;

FIG. **10** shows a sample screenshot of a printer selection UI, according to an exemplary embodiment;

FIG. **11** shows a sample screenshot of a printer selection UI, according to an exemplary embodiment;

FIGS. **12**A-**12**D show sample screenshots of a printer selection UI, according to an exemplary embodiment;

FIG. **13** shows a sample screenshot of a printer selection UI, according to an exemplary embodiment;

FIGS. **14**A-**14**D show sample screenshots of a printer selection UI, according to an exemplary embodiment;

FIGS. **15** and **16** show a data flow diagram and a flow chart, respectively for a method of managing printing in a network environment, according to an exemplary embodiment; and

FIG. **17** shows a flowchart of a method of managing printing in a network environment, according to another exemplary embodiment.

DETAILED DESCRIPTION

In describing preferred embodiments illustrated in the drawings, specific terminology is employed for the sake of clarity. However, the disclosure of this patent specification is not intended to be limited to the specific terminology so selected and it is to be understood that each specific element includes all technical equivalents that operate in a similar manner. In addition, a detailed description of known functions and configurations will be omitted when it may obscure the subject matter of the present invention.

Referring now to the drawings, wherein like reference numerals designate identical or corresponding parts throughout the several views, there are described tools (systems, apparatuses, methodologies, computer program products, etc.) for managing user printing in a network environment having a plurality of printers, multi-function devices, and other network-connected, or standalone, devices.

For example, FIG. **1** shows schematically a system **100** for managing user printing in a network environment, according to an exemplary embodiment. The system **100** includes a device management apparatus **101** including a device management unit **101***a* ad a storage unit **101***b*, a terminal **102**, printing devices **103**-**105**, all of which are interconnected by a network **109**.

In the example of FIG. **1**, the device management unit **101***a* of the device management apparatus **101** is configured to manage the printing devices **103**-**105** and collect device data from the printing devices **103**-**105**. The device data collected by the device management unit **101***a* is further described infra with reference to FIG. **4**A.

Referring back to FIG. **1**, the terminal **102** includes a processing unit **102***a*, a display unit **102***b* and a storage unit **102***c*. The storage unit **102** includes a printer selection program **102***c*-**1** which includes a print job detecting part **102***c*-**1***a*, a device management interface part **102***c*-**1***b*, a printer group extraction part **102***c*-**1***c*, a user interface part **102***c*-**1***d* and a print job submission part **102***c*-**1***e*.

For example, the printer selection program **102***c*-**1** may be executed by the processing unit **102***a*, causing the display unit **102***b* to display a printer selection user interface (UI) to the user at the terminal **102**. The terminal **102** is further described infra with reference to FIG. **5**B.

The print job detecting part **102***c*-**1***a* of the printer selection program **102***c*-**1** is configured to detect and intercept a print job in a print job stream from the terminal apparatus. For example, the detecting part **102***c*-**1***a* may integrate with a port monitor (such as Localspl.dll or Usbmon.dll) which controls i/o (input/output) ports (such as LPT*, COM*, etc.) through which print jobs may be sent to a local printer. In addition, the print job detecting part **102***c*-**1***a* may interface with a port monitor that enables printing to remote printers or network printers (such as standard TCP/IP port monitor). In such instance of a TCP/IP port monitor, the print job is typically configured as a RAW-formatted job to be transmitted via a TCP stream. On the other hand, some print jobs may be submitted via a WSD (Web Services for Devices) port and thus the print job detecting part **102***c*-**1***a* may be configured to interface with a WSD port monitor as well.

Although port monitors are provide as an example, it should be appreciated that print job detection can be performed even when port monitors are not available, such as, for example, in the case of LPR/LPD printing, as well as on other platforms. For example, on some platforms, such as, for example, those that adopt CUPS (Common Unix Printing System), print job detection can be performed by monitoring the spooler.

The device management interface part **102***c*-**1***b* of the printer selection program **102***c*-**1** obtains a list of plural printers, through a network, from a device management unit that manages said plural printers. The printer group extraction part **102***c*-**1***c* of the printer selection program **102***c*-**1** extracts, from the list of said plural printers, a group of printers, based on at least one of an identity of the user or a location of the terminal apparatus. The user interface part **102***c*-**1***d* of the printer selection program **102***c*-**1** provides a printer selection user interface on the terminal apparatus to permit the user to select a specific printer amongst the plural printers, the printer selection user interface including a printer viewing part for displaying one or more printers based on the group of printers extracted by the printer group extraction part. The print job submission part **102***c*-**1***e* of the printer selection program **102***c*-**1** causes the intercepted print job to be transmitted to the specific printer.

Referring back to FIG. **1**, the printing devices **103**-**105** may include, for example, a printer and/or a multi-function device (MFD). While this example of this disclosure simply refers to the printing devices **103**-**105** in the interest of brevity, the aspects of this disclosure are applicable to a network environment having an arbitrary number of devices. An exemplary configuration of a printing device is further described infra with reference to FIG. **5**C.

The network **109** can be a local area network, a wide area network or any type of network such as an intranet, an extranet (for example, to provide controlled access to external users, for example through the Internet), the Internet, etc., or a combination thereof. Further, other communications links (such as a virtual private network, a wireless link, etc.) may be used as well for the network **109**. In addition, the network **109** preferably uses TCP/IP (Transmission Control Protocol/Internet Protocol), but other protocols such as SNMP (Simple Network Management Protocol) and HTTP (Hypertext Transfer Protocol) can also be used. How devices can connect to and communicate over networks is well-known in the art and is discussed for example, in "How Networks Work", by Frank J. Derfler, Jr. and Les Freed (Que Corporation 2000) and "How Computers Work", by Ron White, (Que Corporation 1999), the entire contents of each of which are incorporated herein by reference. Although the printing devices **103**-**105** depicted in FIG. **1** are shown as being connected to one or more networks, the aspects of this disclosure may be applied to a system for managing a device that is not connected to a network but utilizes instead point-to-point communication, such as radio-frequency identification (REID) technology. Such technology is well-known in the art and a description thereof is omitted in the interest of brevity.

With reference to FIG. **2**, a system for managing user printing in a network environment, according to another exemplary embodiment, is described below.

The example of FIG. **2** includes a system **200** which includes an MFP **201**A, a printer **202**A and a scanner **203**A,

all of which are interconnected by an intranet **204**A (collectively "Network A"); an MFP **201**B, a printer **202**B and a scanner **203**B, all of which are interconnected by an intranet **204**B (collectively "Network B"); and a terminal **206** and a device management apparatus **207** (including a device management unit **207***a*), which are interconnected by a network **205**. The network **205** is connected to the intranets **204**A and **204**B. For example, each of the Networks A and B respectively connected by the intranets **204**A and **204**B may represent a regional office of a global/national enterprise having multiple regional offices. The terminal **206** includes a click-to-print unit **206***a* (such as a printer selection program executing on the terminal) which includes a mode determination part **206***a*-**1**. Hereinafter, in this disclosure, the terms "click-to-print unit" and "printer selection program" are used interchangeably.

In the example of FIG. **2**, the device management unit **207***a* of the device management apparatus **207** collects device data from the various devices in the Networks A and B. In addition, the mode determination part **206***a*-**1** which determines whether the intercepted print job is to be processed in a job-specific selection mode or a silent mode. In a case that the mode determination part **206***a*-**1** determines that the intercepted print job is to be processed in the job-specific selection mode, the user interface part causes the printer selection user interface to be displayed to the user, based on the group of printers extracted by the printer group extraction part, to receive user selection of a printer amongst the group of printers, and the print job submission part causes the print job to be transmitted to the user-selected printer. On the other hand, in a case that the mode determination part **206***a*-**1** determines that the intercepted print job is to be processed in the silent mode, the print job submission part causes the user-submitted print job to be transmitted to a previously specified printer.

Otherwise, operations of the elements of the system **200** are similar to those discussed in connection with the corresponding elements of the system **100** of FIG. **1**.

With reference to FIG. **3**, a system for managing user printing in a network environment, according to another exemplary embodiment, is described below.

The example of FIG. **3** includes a system **300** which includes a device management apparatus **301**A including a device management unit **301**A-**1**, an MFP **302**A, a printer **303**A, a scanner **304**A and a terminal **306**, all of which are interconnected by a network **305**A (collectively "Network A"); a device management apparatus **301**B including a device management unit **301**B-**1**, an MFP **302**B, a printer **303**B and a scanner **304**B, all of which are interconnected by a network **305**B (collectively "Network B"); and a core management apparatus **308** including a core management unit **308***a*, which is connected to the device management apparatuses **301**A and **301**B.

In addition, the user at the terminal **306** may be able to access the devices in Network B via the core management apparatus **308**. For example, when the user at the terminal **306** submits a print request, the device management apparatus **301**A may request device data of all the printing devices in Networks A and B (or any other networks managed by the core management apparatus **308**) from the core management apparatus **308**. Such device data may be provided to the printer selection program **306***a*, and the printer selection program **306***a* may extract and display a list of printers to the user at the terminal **306** for user selection. Further, in another embodiment, the printer selection program **306***a* may be configured to communicate (directly or indirectly) with, and receive the device data from, the core management apparatus **308**.

The core management unit **308***a* and/or the device management units **301**A-**1** and **301**B-**1** may be realized by a computer program product including a computer-usable, non-transient medium (such as a disk storage apparatus) having instructions tangibly embodied therein that are executed by a computer. Thus, it should be understood that the core management unit **308***a* and/or the device management units **301**A-**1** and **3015**-**1** may be executed on a computer. While the core management unit **308***a* and/or the device management units **301**A-**1** and **3015**-**1** are shown as being external to the network devices, the core management unit **308***a* and/or the device management units **301**A-**1** and **301**B-**1** may in fact be executed on a client terminal and/or network device.

The core management apparatus **308** and/or the device management apparatuses **301** may include a data store that can comprise one or more structural or functional parts that have or support a storage function. For example, the data store can be, or can be a component of, a source of electronic data, such as a document access apparatus, a backend server connected to a document access apparatus, an e-mail server, a file server, a multi-function peripheral device (MFP or MFD), a voice data server, an application server, a computer, a network apparatus, a terminal etc. It should be appreciated that the term "electronic document" or "electronic data", as used herein, in its broadest sense, can comprise any data that a user may wish to access, retrieve, review, etc.

The system **300** is not limited to the configuration shown in FIG. **3**, and the core management apparatus **308** may be connected to any arbitrary number of device management apparatuses **301** and other devices.

Otherwise, operations of the elements of the system **300** are similar to those discussed in connection with the corresponding elements of the system **100** of FIG. **1**.

With reference to FIGS. **4**A-**4**D, data stored and maintained in the system **100** according to an exemplary embodiment are illustrated.

An example of device data collected by the device management unit **101***a* from the printing devices **103**-**105** is illustrated in FIG. **4**A. As seen in FIG. **4**A, the device data for each printing device may include a variety of attributes such as name, manufacturer, IP address, serial number, status, error/warning, firmware version and department. The information depicted in FIG. **4**A is merely exemplary, and other device information, device properties, device configuration information, and so forth, may be included in the device data collected by the device management unit **101***a*. As non-limiting examples, the device data may include one or more of the following for a given network device: device manufacturer; device model; device serial number; device type (printer, scanner, terminal, etc.); device location (physical address, geographic address, network address, IP address, MAC address, etc.); output technology (e.g., laser, inkjet, solid ink, thermal, other technology, etc.); device location type (e.g., production/copy center, in a specific workgroup area, etc.); scope (e.g., within the scope of administrative responsibility of a particular IT administrator, outside the scope of administrative responsibility of particular IT administrator, etc.); connection type (e.g., network connected, workstation/local connected, non-connected, etc.); functions (e.g., copy, fax, print, scan, copy/scan, copy/fax, copy/print, print/fax, print/scan, copy/print/fax, copy/print/scan, copy/print/fax/scan, etc.); firmware version (e.g., major version, minor version, etc.); installed applications (e.g., application name, major version, etc.); organization (e.g., different groups, subgroups, levels, departments, divisions and so forth within a larger enterprise or institutional entity, such as management group, sales group, marketing group, research & develop-

ment group, etc.); supply level (e.g., consumable types such as paper and toner >empty/low/ok, etc.); capability (e.g., color, economy color, monochrome only, color scan, duplex, A3, not A3, etc.); last status update (e.g., 10 minutes, 60 minutes, 6 hours, etc.); duplex usage (e.g., 2:1, 1:2, 2:2, Book Duplex, etc.); paper size usage (e.g., A3, A4, 134, etc.); pages per job (e.g., 1, 2, 6-10, etc.); pages per minute (PPM) range (e.g., 1-20 ppm, 41+ ppm, etc.); color technology (e.g., professional color, convenience color, etc.); audit results/analysis (e.g., devices which satisfied a particular audit or test, devices which did not satisfy a particular audit or test, etc.); and so forth.

The device data collected by the device management unit **101***a* may also include error history information that includes a log of all errors occurring at the corresponding managed device, and usage history information indicating which users have the utilized the managed device and when such use has occurred. The usage history information may indicate, for example, a number of total impressions (e.g. pages) produced by a user, or a number of specific types of impressions (copy color, copy BW, print color, print BW, etc.) produced by a user.

The device management unit **101***a* communicates with one or more of the plurality of printing devices to collect and obtain the various device data corresponding to each device. Many printers and other devices store data indicating their attributes or properties in a Management Information Base (MIB). The MIB may conform with the SNMP (Simple Network Management Protocol) protocol, and properties information can be obtained directly from the MIB through SNMP queries. In this way, the device management unit **101***a* is configured to discover and/or poll the corresponding plurality of network devices to obtain the device data from the network devices.

The device management unit **101***a* may obtain the device data (such as the name, status, configuration information, error history, usage history, etc.) from each network device by monitoring a network to which the device is connected (i.e. network **109**), and detecting and receiving one or more alert notifications or status updates transmitted to the network from any of the plurality of network devices (e.g. printing devices **103-105**). For example, the device management unit **101***a* may receive the status updates by repeatedly transmitting requests to the printing devices **103-105** via the network **109**, inquiring as to the status of each device. In response, each device may transmit status updates back to the device management unit **101***a*, wherein each status update indicates the device name, status, configuration information, error history, usage history, whether an error exists or has occurred at the network device, etc. Alternatively, each network device may automatically transmit status updates to the device management unit **101***a* (without waiting for requests or queries from the device management unit **101***a*), at regular intervals or whenever an error occurs at the network device. The device management apparatus **101** may include locally resident hardware and/or software agents installed locally on each of the printing devices **103-105**, which are configured to transmit the status updates directly to the device management unit **101***a*. The device data may be stored along with other data in a data store external to the device management apparatus **101**, or alternatively, in the storage unit **101***b* resident in the device management apparatus **101** and retrieved as needed.

Other information that may be stored in the system **100** (e.g. by the device management apparatus unit **101***a* or the printer selection program **102***c*-**1**) includes printer location information, as shown in FIG. **4**B. The printer location information of FIG. **4**B includes a device ID, IP address and location information for each device. In another exemplary embodiment, the location information may be represented by other systems such as GPS coordinates, etc.

In addition, user access information such as shown in FIG. **4**C may also be stored in the system **100**. Such user access information may include a device ID, IP address and user access information for each device. In the example of FIG. **4**C, the user access information indicates, for each specific device, the users (or group of users) who have access to the specific device.

FIG. **4**D shows sample configuration item information maintained, for example, by the printer selection program **102***c*-**1**, according to an exemplary embodiment. In the example of FIG. **4**D, each configuration item included in the configuration item information has an item ID (e.g. "1"), an item name (e.g. "CurrentPrinterAddress") and an item value (e.g. "192.15.201.102"). For example, the value of the configuration item "CurrentPrinterAddress" indicates the network address of the printer currently selected by the user. Similarly, "Silent" indicates whether the printer selection UI is to be displayed to the user when the user submits a print request (e.g. set to print without displaying the print selection UI); "ServerAddress" indicates the network address of the device management unit (e.g. device management unit **101***a* of FIG. **1**); "CacheExpire" indicates the length of time (e.g. in minutes) to cache the browse/nearby data from the device management unit; "NearbyBits" indicates how many subnet levels are to be displayed when the "nearby" button (e.g. shown in FIG. **8**A) is activated (e.g. set to 8 to display a Class C subnet, 16 to display a Class B subnet, etc.); "HideNearby" indicates whether to hide the "nearby" button on the printer selection UI (e.g. set to 1 to hide); "HideFavorites" indicates whether to hide the "favorites" button on the printer selection UI (e.g. set to 1 to hide); "HideBrowse" indicates whether to hide the "browse" button on the printer selection UI (e.g. set to 1 to hide); "HideFilter" indicates whether to hide the "filter" button on the printer selection UI (e.g. set to 1 to hide); "HideMap" indicates whether to hide the "View Map" button on the printer selection UI (e.g. set to 1 to hide); and "Favorites" indicates the list of printers saved by the user as "favorite". The list of printers is specific to the particular terminal apparatus and the identity of the user (e.g. user ID). For example, the list of printers stored for the user on his or her work computer may be different from the list of printers stored for the same user on his or her home computer. Further, "CurrentFilter" includes the specification of a currently selected filter (e.g. "custom_1" including a set of columns and corresponding values), "Fields" includes a comma-separated set of field names to be displayed in the printer list (e.g. "fields.csv"), and "Categories" includes a comma-separated set of categories to be displayed (e.g. "categories.csv").

The information (such as shown in FIGS. **4**A-**4**D) collected and/or stored in the system **100** is not limited to those discussed in the present disclosure, and may include other information relevant to providing document management services. Such information can be stored in an internal storage resident in the document management apparatus **101** and/or the terminal **102**. Alternatively, the information can be stored externally in a storage unit connected to the document management apparatus **101** and/or the terminal **102**, or accessible via the network **109**, and retrieved as needed. For example, the information may be stored in one or more databases [e.g. off-the-shelf database applications based on SQL (Structured Query Language), or other customized database applications with search/query function]. If the information is stored in more than one location, the information may be synced, for example, periodically or upon a user request.

FIG. 5A shows an exemplary configuration of a computing device that can be configured (for example, through software) to operate (at least in part) as the core management apparatus **308** of FIG. **3** and/or device management apparatuses **401** illustrated in FIG. **3**. As shown in FIG. **5**A, the management unit **500** includes a controller (or central processing unit) **501** that communicates with a number of other components, including memory or storage part **502**, network interface **503**, display **504** and keyboard **505**, by way of a system bus **509**.

The management unit **500** may be a special-purpose device (such as including one or more application specific integrated circuits or an appropriate network of conventional component circuits) or it may be software-configured on a conventional personal computer or computer workstation with sufficient memory, processing and communication capabilities to operate as a terminal and/or server, as will be appreciated to those skilled in the relevant arts.

In the management unit **500**, the controller **501** executes program code instructions that control device operations. The controller **501**, memory/storage **502**, network interface **503**, display **504** and keyboard **505** are conventional, and therefore in order to avoid occluding the inventive aspects of this disclosure, such conventional aspects will not be discussed in detail herein.

The management unit **500** includes the network interface **503** for communications through a network, such as communications through the network **109** with the printing devices **103-105** in FIG. **1**. However, it should be appreciated that the subject matter of this disclosure is not limited to such configuration. For example, the management unit **500** may communicate with client terminals through direct connections and/or through a network to which some components are not connected. As another example, the management unit **500** does not need to be provided by a server that services terminals, but rather may communicate with the devices on a peer basis, or in another fashion.

The core management unit and/or the device management units of the present disclosure are not limited to a server or computer, but can be manifested in any of various devices that can be configured to communicate over a network and/or the Internet.

An example of a configuration of the terminal **102** of FIG. **1** and/or other terminals described in the present disclosure (for example, as a computer) is shown schematically in FIG. **5**B. In FIG. **5**B, computer **550** includes a controller (or central processing unit) **552** that communicates with a number of other components, including memory **553**, display **554**, keyboard (and/or keypad) **557**, other input/output (such as mouse, touchpad, stylus, microphone and/or speaker with voice/speech interface and/or recognition software, etc.) **558**, network interface **559**, print driver **556** and application software **555**, by way of an internal bus **551**.

The memory **553** can provide storage for program and data, and may include a combination of assorted conventional storage devices such as buffers, registers and memories [for example, read-only memory (ROM), programmable ROM (PROM), erasable PROM (EPROM), electrically erasable PROM (EEPROM), static random access memory (SRAM), dynamic random access memory (DRAM), non-volatile random access memory (NOVRAM), etc.].

The network interface **559** provides a connection (for example, by way of an Ethernet connection or other network connection which supports any desired network protocol such as, but not limited to TCP/IP, IPX, IPX/SPX, or NetBEUI) to the network to which the computer **550** is connected (e.g. network **109** of FIG. **1**).

Print driver **556** and application software **555** are shown as components connected to the internal bus **551**, but in practice are typically stored in storage media such as a hard disk or portable media, and/or received through the network, and loaded into memory **553** as the need arises.

Depending on the type of the particular terminal device, one or more of the components shown in FIG. **5**B may be missing. For example, a particular mobile phone may be missing the print driver **556** and the keyboard **557**.

Additional aspects or components of the computer **550** are conventional (unless otherwise discussed herein), and in the interest of clarity and brevity are not discussed in detail herein. Such aspects and components are discussed, for example, in "How Computers Work", by Ron White (Que Corporation 1999), and "How Networks Work", by Frank J. Derfler, Jr. and Les Freed (Que Corporation 2000), the entire contents of each of which are incorporated herein by reference.

FIG. **5**C shows a schematic diagram of a configuration of a network-connected device as an MFD, according to an exemplary embodiment, which can be any apparatus (including a microprocessor chip or a collection of devices having varying degree of integration) that has the ability to perform two or more functionalities.

The MFD **590** shown in FIG. **5**C includes a controller **592**, and various elements connected to the controller **592** by an internal bus **591**. The controller **592** controls and monitors operations of the MFD **590**. The elements connected to the controller **592** include storage **593** (for example, random access memory, read-only memory, hard disk drive, portable storage media drive such as for optical discs, magnetic discs, magneto-optical discs, etc., semiconductor memory cards, combinations of storage media, etc.), printer engine **594**, scanner engine **595**, network interface (I/F) **596**, converter **598** for converting data from one format to another format (for example, a format suitable for printing, faxing, e-mailing, etc.), and user I/O (Input/Output) **599**. The controller **592** also utilizes information stored in user management table **597** to authenticate the user and control user access to the functionalities of the MFD **590**.

Storage **593** can include one or more storage parts or devices [e.g. a read only memory (for example, ROM, PROM, EPROM, EEPROM, etc.), a random access memory (RAM), a hard disk drive (HOD), portable media (for example, floppy disk, optical disc, magnetic discs, magneto-optical discs, semiconductor memory cards, etc.) drives], and program code instructions can be stored in one or more parts or devices of storage **593** and executed by the controller **592** to carry out the instructions. Such instructions can include instructions for performing specified functions (such as printing, scanning, faxing, copying, e-mailing, etc.) of the MFD **590**, to enable the MFD **590** to interact with a terminal, as well as perhaps other external devices, through the network interface **596**, and to control the converter **598**, access data in the user management table **597**, and interactions with users through the user I/O **599**.

The network interface **596** is utilized by the MFD **590** to communicate with other network devices such as a terminal or a device management apparatus (e.g., device management apparatus **101** of FIG. **1**) and receive data requests, print jobs, user interfaces, and etc.

The user I/I **599** includes one or more display screens **599***b* that display, under control of controller **592**, information allowing the user of the MFD **590** to interact with the MFD **590**, The display screen **599***b* can be any of various conventional displays (such as a liquid crystal display, a plasma display device, a cathode ray tube display, etc.), but prefer-

ably is equipped with a touch sensitive display (for example, liquid crystal display) and is configured to provide a GUI (graphical user interface) **599***c* based on information input by an operator of the MFD **590**, so as to allow the operator to interact conveniently with services provided on the MFD **590**, or with the MFD **590** serving as terminal for accessing electronic data or other content through the network. User interfaces or other contents received through the network via the network interface **596** can be displayed on the display screen **599***h*.

The display screen **599***b* does not need to be integral with, or embedded in, a housing of the MFD **590**, but may simply be coupled to the MFD **590** by either a wire or a wireless connection. The user I/O **599** may include keys and/or buttons (such as graphical keys or buttons, or other graphical elements, of a GUI on a touchscreen display) for inputting information or requesting various operations. Alternatively, the user I/O **599** and the display screen **5996** may be operated by a keyboard, a mouse, a remote control, voice recognition (e.g., through a speaker/microphone **599***a*), or eye-movement tracking, or a combination thereof.

Printer engine **594**, scanner engine **595** and network interface **596** are otherwise conventional, and therefore, a detailed description of such conventional aspects is omitted in the interest of clarity and brevity.

The MFD **590** can have any or all of the functions of similar devices conventionally known, such as for scanning, editing and storing images, sending a fax, sending and receiving e-mails with or without attachments, accessing files by FTP or another protocol or facility, surfing the Web, etc. Further, multi-functional devices or multi-function peripheral devices can play a prominent role to convert hardcopy documents to electronic documents.

As discussed above, the MFD **590** may also operate as a device management apparatus (e.g. device management apparatus **101** of FIG. **1**). The operation of such device management apparatus according to an exemplary embodiment is described supra with reference to FIG. **1**.

FIG. **6** shows a screenshot of a word processing application for allowing the user at a terminal apparatus to create, modify and print documents. As shown in FIG. **6**, such word processing application has various functionalities that the user may access via the buttons at the top of the screen (e.g. "file" for creating, opening and saving documents, "edit" for editing the document, "insert" for inserting objects into the document, "view" for viewing various tools, and "help" for obtaining additional information). There may be provided shortcuts to frequently used functionalities such as printing a document (in the example of FIG. **6**, the buttons "new", "open", "save" and "print" are provided).

If the user activates the "print" button in FIG. **6**, in an exemplary embodiment, the document may be sent directly to a predetermined printer without further prompting the user. As shown in FIG. **7**, in such embodiment, a message may be displayed to the user, indicating that the document was successfully sent to the predetermined printer.

On the other hand, in another exemplary embodiment, a printer selection user interface (UI) may be displayed to the user, as shown in FIG. **8**A, to permit the user to specify a printer to which the document should be sent. In the example of FIG. **8**A, three categories ("print", "view" and "find") of buttons are displayed at the top of the screen. The "print" category includes a "print" button for printing from a selected printer and a "cancel" button for canceling the print job. The "view" category includes a "recent" button for displaying a list of printers that have recently been used by the user, a "nearby" button for displaying a list of printers that are nearby from the user's location, and a "favorites" button for displaying the user's previously saved favorite printers. The "find" category includes a "browse" button for displaying a list of printers using a selection tree, a "filter" button for providing a filter for narrowing down the list of printers displayed to the user, and a "view map" button for displaying a map indicating the location of available printers.

FIG. **8**B shows the screen in which the user has selected a printer. As shown in FIG. **8**B, the "print" button and the "+" button have become enabled.

In the examples of FIGS. **8**C and **8**D, the printers are displayed in an icon view format.

FIG. **9** shows an example in which the user has activated the "recent" button. As shown in FIG. **9**, the user can specify the duration for which to display the printers (e.g. "last month").

FIG. **10** shows an example in which the user has activated the "nearby" button. As shown in FIG. **10**, the user can specify the distance which qualifies as being "nearby" (e.g. 100 ft).

FIG. **11** shows an example in which the user has activated the "favorites" button. As shown in FIG. **11**, the user can maintain numerous favorite lists. When a printer on the list of the user's favorite list is selected, the "−" button becomes enabled. Activating the "−" button removes the selected printer from the user's favorite list.

FIG. **12**A shows an example in which the user has activated the "browse" button. As shown in FIG. **12**A, when the user activates the "browse" button, a list of categories are displayed in a drop-down menu. In the example of FIG. **12**A, such list includes "IP address", "location" and "model". When the user selects "IP Address" for example, a screen shown in FIG. **12**B is displayed to the user. Using the panel displayed on the left side of the screen, the user can navigate through the plurality of printers available to the user to select the printer he or she wishes to print from. If the user selects "location", a screen shown in FIG. **12**C is displayed to the user. Similarly, if the user selects "model", a screen shown in FIG. **12**D is displayed to the user.

FIG. **13** shows an example in which the user has activated the "filter" button. As shown in FIG. **13**, each column (i.e. field) gets its own filter for permitting the user to specify a filter value. When the user specifies the filter value for a specific column, only those printers having a value matching the filter value for the specific column are displayed to the user.

FIG. **14**A shows an example in which the user has activated the "view map" button. As shown in FIG. **14**A, the displayed map shows the location of the various printers available to the user. The user may activate the "zoom-in" button to zoom in (FIG. **14**B), place the cursor on a particular printer to see further details of the particular printer (FIG. **14**C), and/or select a printer to print from the selected printer (FIG. **14**D).

Turning now to FIG. **16**, there is shown a flowchart of a method for managing user printing in a network environment, according to an exemplary embodiment.

In S**1601**, a printer selection program detects and intercepts a print job in a print job stream (step S**1055** in FIG. **15**) from a terminal apparatus. The printer selection program then obtains a list of plural printers from a device management unit (step S**1056** and S**1057** in FIG. **15**) that manages said plural printers (step S**1602**), extracts, from the list of said plural printers, a group of printers, (step S**1058** in FIG. **15**) based on at least one of the identity of the user or the location of the terminal apparatus (step S**1603**), and causes a printer selection UI to be displayed on the terminal apparatus (step S**1059** in FIG. **15**) to permit the user to select a specific printer amongst said group of printers (step S**1604**). When the printer

selection program receives user selection of a printer, the printer selection program causes the intercepted print job to be transmitted to the specific printer (step S**1060** in FIG. **15**) selected by the user (step S**1605**).

Turning now to FIG. **17**, there is shown a flowchart of a method for managing user printing in a network environment, according to an exemplary embodiment.

In S**1701**, a printer selection program determines based on stored configuration items whether an intercepted print job is to be transmitted directly to a predetermined direct printer or transmitted to a printer selected via a printer selection UI. If the user has specified a direct printer (YES, S**1702**), the printer selection program transmits the intercepted print job directly to the predetermined direct printer (step S**1703**). Otherwise, the printer selection program displays a printer selection UI (step S**1704**), receives user selection of a specific printer (step S**1705**), and transmits the intercepted print job to the user-selected specific printer (step S**1706**).

The orders in which the steps are performed in the aforementioned methods are not limited to those shown in the examples of FIGS. **15-17**, and may be switched as long as similar results are achieved. Also, it should be noted that the methods illustrated in the examples of FIGS. **15-17** may be implemented using any of the systems described in connection with FIGS. **1-3**.

The aforementioned specific embodiments are illustrative, and many variations can be introduced on these embodiments without departing from the spirit of the disclosure or from the scope of the appended claims. For example, elements and/or features of different examples and illustrative embodiments may be combined with each other and/or substituted for each other within the scope of this disclosure and appended claims.

What is claimed is:

1. A system for managing devices accessible through a network, the system including:

one or more device management apparatuses configured to collect device data from a plurality of printing devices and manage the printing devices;

a device database registering the device data collected by the device management apparatuses from the plurality of printing devices; and

a terminal apparatus including a click-to-print unit configured to include:

a print job detecting part that detects when a print job has been submitted by a user of the terminal apparatus to a print job stream of the terminal apparatus, and holds the print job in the terminal apparatus before transmitting said print job to a printer;

a mode determination part that determines, while the print job is held in the terminal apparatus, whether the print job is to be processed in job-specific selection mode or silent mode;

a device management interface part that obtains, from one of the device management apparatuses or from the device database, a list of plural printing devices, upon the print job detecting part detecting the print job;

a printer group extraction part that extracts, from the list of said plural printing devices, a group of printers, based on at least one of user identification and user location information;

a printer selection user interface that presents the group of plural printers for the user of the terminal apparatus to select a specific printer amongst the plural printers;

a mode selection user interface for the user to select the job-specific selection mode or the silent mode and to specify a silent-mode printer that is to be associated with the user and to which print jobs submitted by the user are to be automatically transmitted, without user selection of a printer specifically for any particular job when the silent mode is selected; and

a print job submission part that causes the print job to be transmitted to the specific printer in response to determination by the mode determination part that the print job is to be processed in the job-specific selection mode, and

wherein in response to the print job detecting part detecting the print job, the mode determination part determines whether the user has specified a silent-mode printer and

(a) in response to the mode determination part determining that the user has specified a silent-mode printer, the mode determination part determines that the print job is to be processed in the silent mode, and the print job is transmitted to the silent-mode printer, and

(b) in response to the mode determination part determining that the user has not specified a silent-mode printer,

the mode determination part determines that the print job is to be processed in the job-specific selection mode, and

then the device management interface part obtains, from a device management apparatus or the device database, the list of plural printing devices, and

then the printer group extraction part extracts, from the list of said plural printing devices, the group of printers, based on at least one of the user identification and the user location information, and

then the printer selection user interface displays the group of printers extracted by the printer group extraction part and receives selection by the user of the specific printer amongst the group of printers, and

then the print job submission part causes the print job to be transmitted to the specific printer selected by the user through the printer selection user interface.

2. The system of claim **1**, wherein

the printer selection user interface displays one or more printer groups included in a printer category, each one of said one or more printer groups including one or more printers, and

when the user selects a specific printer group amongst said one or more printer groups, the printer selection user interface displays, for selection of a particular printer, said one or more printers included in the specific printer group.

3. The system of claim **1**, wherein the printer selection user interface further includes a filter part for the user to specify or select filter criteria to filter said printers to display only printer that match the filter criteria.

4. The system of claim **1**, wherein the printer group extraction part extracts the group of printers by determining particular printers amongst the plural printers that are located within a predetermined distance from a current location of the terminal apparatus.

5. The system of claim **1**, wherein the printer selection user interface further includes a map viewing part for displaying a map view of said printers in the group extracted by the printer group extraction part, in a case that the group of printers is extracted based on the user location information, and

wherein the map view indicates a location of each specific printer amongst said printers displayed in the map view, and

when the user selects a printer amongst said one or more printers displayed in the map view, the map viewing part displays properties information of the selected printer.

6. The system of claim 1, wherein the printer group extraction part extracts the group of printers by determining which of the plural printers the user is permitted to access.

7. The system of claim 1, wherein the printer group extraction part extracts, from the list of said plural printing devices, a group of printers, based on at least one of user identification and user location information, that are nearby the terminal apparatus.

8. A printer selection program of instructions embodied in a non-transitory computer-readable medium and executable by a processing unit of a terminal apparatus, to configure the terminal apparatus to include:

a print job detecting part that detects when a print job has been submitted by a user of the terminal apparatus to a print job stream of the terminal apparatus, and holds the print job in the terminal apparatus before transmitting said print job to a printer;

a mode determination part that determines, while the print job is held in the terminal apparatus, whether the print job is to be processed in job-specific selection mode or silent mode;

a device management interface part that obtains a list of plural printers, through a network, from a device management unit that manages said plural printers;

a printer group extraction part that extracts, from the list of said plural printers, a group of printers, based on at least one of user identity or a location of the terminal apparatus;

a user interface part that provides a printer selection user interface on the terminal apparatus

a printer selection user interface that presents the group of plural printers for the user of the terminal apparatus to select a specific printer amongst the plural printers, and

a mode selection user interface for the user to select the job-specific selection mode or the silent mode and to specify a silent-mode printer that is to be associated with the user and to which print jobs submitted by the user are to be automatically transmitted, without user selection of a printer specifically for any particular job, when the silent mode is selected; and

a print job submission part that causes the print job to be transmitted to the specific printer in response to determination by the mode determination part that the print job is to be processed in the job-specific selection mode,

wherein in response to the print job detecting part detecting the print job, the mode determination part determines whether the user has specified a silent-mode printer and

(a) in response to the mode determination part determining that the user has specified a silent-mode printer, the mode determination part determines that the print job is to be processed in the silent mode, and the print job is transmitted to the silent-mode printer and

(b) in response to the mode determination part determining that the user has not specified a silent-mode printer, the mode determination part determines that the print job is to be processed in the job-specific selection mode, and

then the device management interface part obtains, from the device management unit, the list of plural printers, and

then the printer group extraction part extracts, from the list of said plural printers, the group of printers, based on at least one of the user identification and the user location information, and

then the printer selection user interface displays the group of printers extracted by the printer group extraction part and receives selection by the user of the specific printer amongst the group of printers, and

then the print job submission part causes the print job to be transmitted to the specific printer selected by the user through the printer selection user interface.

9. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the printer selection user interface includes a printer viewing part that displays the printers in the group extracted by the printer group extraction part, in a list view format.

10. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the printer selection user interface includes a printer viewing part that displays icons representing the printers, respectively, in the group extracted by the printer group extraction part.

11. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein

the printer selection user interface further includes a printer locating part indicating printer groups included in a printer category, each of said printer groups including one or more printers, and

when the user selects a specific printer group amongst said printer groups, the printer viewing part displays said one or more printers included in the specific printer group.

12. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the printer selection user interface further includes a map viewing part for displaying a map view of said printers in the group extracted by the printer group extraction part, and

the map viewing part includes a zoom-in button for zooming in on a portion of the map and a zoom-out button for zooming out of a portion of the map.

13. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the device management interface part communicates with the device management unit to obtain location information of said one or more printers to be displayed by the printer selection user interface.

14. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the printer selection user interface further includes

a favorite printer selection part for permitting the user to select a specific printer amongst said one or more displayed printers to add the specific printer to a favorite printer list, and

a favorite printer viewing part for displaying one or more printers added to the favorite printer list by the user.

15. The printer selection program of instructions embodied in a non-transitory computer-readable medium of claim 8, wherein the printer selection user interface further includes a recent printer viewing part for displaying a list of printers to which the user has recently submitted print jobs.

16. A method performed by a terminal apparatus to facilitate quick printing of documents, files and/or other pages, the method comprising:

(a) providing a mode selection user interface for a user of the terminal apparatus to select a job-specific selection mode or a silent mode and to specify a silent-mode printer that is to be associated with the user and to which print jobs submitted by the user are to be automatically transmitted, without user selection of a printer specifically for any particular job, when the silent mode is selected;

(b) detecting when a print job has been submitted by a user of the terminal apparatus to a print job stream of the

terminal apparatus and holding the print job in the terminal apparatus before transmitting said print job to a printer;

(c) determining, in response to detection in (b) of the print job and while the print job is held in the terminal apparatus, whether the user has specified a silent-mode printer;

(d) determining, in response to determining in (c) that the user has specified a silent-mode printer, that the print job is to be processed in the silent mode, and then transmitting the print job to the silent-mode printer, and

(e) determining, in response to determining in (c) that the user has not specified a silent-mode printer, that the print job is to be processed in the job-specific selection mode, and

(e1) then obtaining a list of plural printers, through a network, from a device management system that manages said plural printers, and

(e2) then extracting, from the list of said plural printers, a group of printers, based on at least one of user identity and user location, and

(e3) then displaying, via a printer selection user interface on the terminal apparatus, the group of printers extracted (e2), to permit the user to select a specific printer amongst the plural printers, and receiving selection by the user of the specific printer amongst the group of printers, and

(e4) then causing the print job to be transmitted to the specific printer.

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